

PERSONAL *weekly* COMPUTER

50p February 11, 1984 No 48

NEWS

BRITAIN'S BIGGEST WEEKLY

FREE LYNX LISTING

Draw the right line
to escape from Gridtrap

SPECTRAVIDEO TEST

Enter the Japanese
MSX micro standard

EPSON ASIDES

Sideways printing
on the HX-20

TEST PLAY...

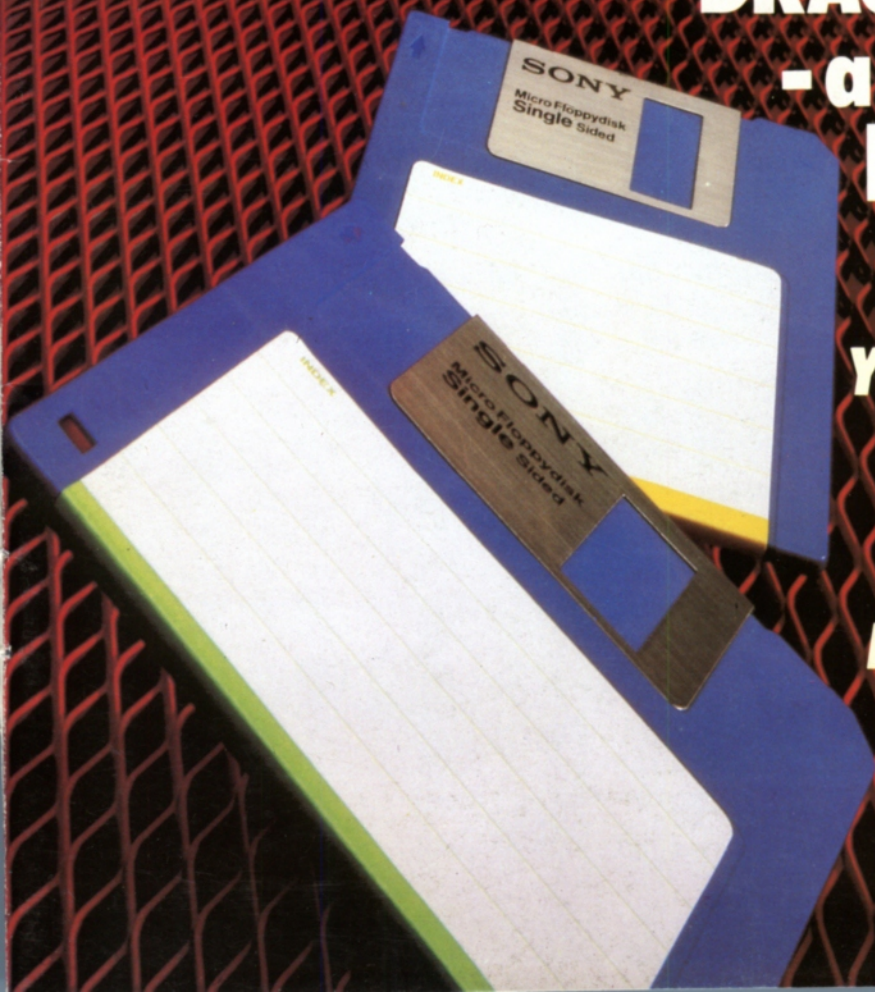
... of action for Spectrum,
Commodore 64 and Vic 20



DRAGON DISK DRIVES
- a microfloppy
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A new twist for Epson

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Shrinking disk storage comes to the Dragon via Sony's 3in drives. Brian Cadge looks at the hardware together with a new interface and toolkit.



New for old with Aztec, p53

MICROPAEDIA

Pull out and keep

An A to Z of Atari

Part two looks at the vast range of software available, gives a round-up of Atari books and features the second instalment of Atari Basic.

Competition**Win an Atari 600XL** 23

You could win a share of £1,250 of prizes. We're giving away six Atari 600XLs, copies of the Atariwriter word processor and versions of Donkey Kong to run on Ataris, Commodores or the TI-99/4A.

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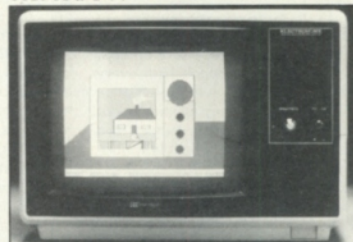
The new MSX 'standard' was variously welcomed and derided. Now John Lettice gives a full test to the first micro claiming MSX compatibility: the Spectravideo 328.

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Beneath the exterior of the Atari 800XL, Geof Wheelwright finds an old friend.

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High res on the cheap

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Just how good is educational software? Colin Cohen gives his marks to five packages for the BBC Micro.



Eight arms make light of leaning

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Go flying or risk death in Zorgon's kingdom.

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All action round-up of five new releases.

Curse descends on QL

By Ian Scales

Microcomputing's oldest curse is about to fall on its newest sensation. The Sinclair QL, the latest shooting star, is likely to be in short supply.

According to Sinclair Research it greatly underestimated the initial demand for the QL. It is taking orders at the moment at the rate of about 500 a day — to save you the trouble this works out at £977,000 a week.

The company is currently preparing to issue letters to those who have ordered, explaining the expected delay. It has already started sending out cards to people who have ordered the machines to confirm that their orders are 'being processed'.

Perhaps users are entitled to express cynicism and frustration at this (not unexpected) development — it seems to happen with every product Sinclair releases. To be fair, however, even Sinclair was not prepared for such a response. The QL is, after all, ostensibly a business machine.

Part of the problem is simply that the company's products have



proved to be so popular that Sinclair never expects the demand they generate.

■ Meanwhile, reports of the ZX81's death appear to have been greatly exaggerated. Against all odds the machine continues to sell in vast numbers. According to Sinclair the orders from retailers indicated that people were buying again during the run-up to Christmas (perhaps partly as a result of the Spectrum drought).

Sinclair expected ZX81 production to continue but to be devoted to 'third world' countries (including Red China).



The old and the new — ZX81 stages a comeback while QL builds up a backlog.

Instead of this the ZX81 continues to occupy a prime 'cheapest available computer' slot at the bottom of the market where there is really no direct competition — especially when available software is taken into consideration. Sinclair suggests that it provides a low-cost introduction to people who want to come to terms with a computer and so be better placed to make a

considered buy later, when they know what they require.

However, there is undoubtedly a largely untapped source of sales in countries rarely considered in terms of the microcomputer boom. Following the recent success of the Oric in France, Spain has become one of the big new markets for Sinclair.

The company recently ran an extensive promotion there.

Dealers are baled out

By Ralph Bancroft

In the wake of the collapse of Computers for All (Issue 47), manufacturers and suppliers have rallied round to help out C for A's 50-plus dealer network.

First off the mark was Apple which has written to the dealers to say that it will supply them direct and provide after-sales support.

Prism Microproducts, which supplied Computers for All with Sinclair Spectrums, is also considering

how it can help out the dealers. 'We are looking kindly on them,' said Prism's deputy managing director, Terry Brown. 'We will continue to supply them by using stock that was already allocated to Computers for All and will honour any returns they have received.'

Acorn, which is owed the largest sum by Computers for All, confirmed that it will also continue to supply machines either direct or through its regional distributors. One problem it has yet to sort out is that C for A was the regional distributor for Kent and Essex, so it will now have to find another firm to take over the task.



VOCALIST — Commodore's speech unit, Magic Voice, will be available as an add-on for the Commodore 64 within the next few weeks. The unit is digital, and comes with a 250 word vocabulary. It is the same basic system as that going into at least one of the new range of Commodores (Issue 46), due to be released in May. Magic Voice will be transformed into a more practical and powerful device when a text-to-speech conversion cartridge is released in the summer. Commodore has plans to put speech into most of its programs. PCN will publish an exclusive pro-test of Magic Voice in Issue 50.

Prices of daisies still dropping fast

Following last week's news of the drop in the price of daisywheel printers the cost of the Smith-Corona TP-1 has been cut still further, this time by Intelligent Interfaces, to £235.75.

The rapid drop in the price of daisywheels may be attributable to the increase in dot matrix quality. New dot matrix printers are being made in Japan that rival daisywheel quality while running much faster

and more quietly. As they find their way into the UK, the bottom may drop out of the cheap end of the daisywheel market.

The next stage could well prove to be a reduction in the costs (if not immediately in the prices) of non-impact printing. Ion deposition and laser printers are steadily coming down in price, in obedience to the same rules of technological and commercial development that are affecting prices of daisywheel and dot matrix devices.

For the present, non-impact printers will be well beyond the range of most computer users and this is likely to be the case for some time to come.

The Spirit of survival

By Wendie Pearson

Almarc Data Systems has been rescued by High Technology Electronics Limited (HTE) in a deal struck on January 21. HTE, a subsidiary of the giant Grand Metropolitan Group, has bought Almarc's business, but not the company itself, ensuring that sales and maintenance of the Spirit micro range will continue normally (Issue 46).

Tim Roberts, managing director of HTE in Southampton, said: 'We've bought the assets, Almarc's name and the premises and left the rest to the receiver to sort out. They are a very good company and we

like their products, which are compatible with our own — we make micros for a number of suppliers, including the Minstrel system for Hotel Microsystems.'

Mr Roberts added that Almarc was no longer a limited company, but a business, and that a company called Newport Management Limited had been formed two days before the takeover for the sole purpose of buying Almarc's assets.

Newport will be a subsidiary of HTE but will trade under the name of Almarc with the Spirit micro range continuing to sell from the same 30 dealers. Meanwhile, the head office remains in Nottingham.

Fuller lays it on line

By John Lettice

After months of waiting, and many irate customers later, the Fuller FDS keyboard for the Spectrum is, according to Fuller's Roy Backhouse, at last readily available.

Mr Backhouse promised the keyboards would be sold directly to customers at the Tenth ZX Microfair last weekend, so if you were there, now you know.

But why has the FDS's gestation period been so long, and why did Fuller continue to advertise it and build up a waiting list for it through last year when it wasn't available? Last autumn Mr Backhouse told PCN that the company had been going through a reorganisation —

he now says this was a lot more searching than had been envisaged. The problem, he says, is the micro industry has been evolving from the position of supplying a small enthusiast's market into a big business, and that Fuller has had to make this transition.

He also points to a fire and a succession of burglaries as having held up the FDS, and says that the introduction of weekly computer magazines had caught the company on the hop. 'We were expecting a three month lead time before the ads actually appeared.' This last point won't cut much ice with people who replied to regular ads in weekly and monthly magazines.

Fuller's formal announcement of FDS availability, and to a lesser extent Mr Backhouse himself, show a breathtaking lack of contrition. But he does say that with hindsight it might have been better to hold the advertising until the FDS was ready. Even so, 'after the embarrassing success of the FDS keyboard in 1983' and 'virtually from its conception the FDS keyboard has been unique' are absurdly extravagant claims.

PCN is also deeply sceptical about the claim that the Microdrive is 'easily adapted to go inside.' We'll let you know once we've bought the hack saw.

Nevertheless at first sight the

FDS does seem a good product. Fuller claims to be producing 1,000 a week, and producing a 28 day turnaround on orders. If it is to succeed, Fuller is going to have to put a lot of work into regaining some of its credibility. Mr Backhouse says the company has established a consumer hotline (Liverpool 709 9280) to deal with customers' queries, and has promised to deal with the letters of complaint that PCN has received from customers.

For the future, the company plans to adapt the Orator unit to the BBC and the Dragon, and to produce an expansion box for the FDS.

QL quick wits

An independent Sinclair QL user group has been set up, proving that others besides Sir Clive are determined to stay one jump ahead.

The non-profit making group, IQLUG, is the progeny of Leon Heller and Brian Pain who founded and run NATUG for TRS-80 and Genie users.

QL fans are urged to write 'in if you are having trouble with your system'. Their biggest trouble is likely to lie in working out how many monthly newsletters will arrive before the machine itself.

If you want to take advantage of the current six-month trial subscription for £3.25, contact Brian Pain (Acting Secretary), 24 Oxford Street, Stony Stratford, Milton Keynes.

COMMENT TIME

Soft shock due

By John Lettice

A major upheaval looks to be on the way in software publishing and one of the first results you'll see could be a reduction in the number of independent software producers.

Quicksilva, a company that demonstrated a talent for prophecy by being among the first to produce software for the Spectrum, expects a shake-out. 'Our contention is that there are too many software houses competing in this country,' says Quicksilva's Rod Cousins. 'In the near future you'll see reciprocal

marketing agreements, mergers and liquidations.'

Clearing the decks for this possibility the company has announced an agreement with New Generation Software which gives Quicksilva a worldwide marketing and distribution rights for New Generation's Commodore 64 games.

Negotiations are also underway with Thorn EMI and CBS to give one of these companies manufacturing, distribution and marketing rights for Quicksilva games in all countries bar the UK and US. It's

still uncertain which one it's going to be, but CBS seems the likelier.

Mr Cousins sees these moves taking Quicksilva into a position similar to a conventional publisher's, but they don't mean the company is looking to take over a succession of smaller houses in the future.

Quicksilva's announcement comes at the same time as the launch of a number of new games. The most interesting of these is the Snowman, which confounds the Tolkien estate by being based on Raymond Briggs' book of the same name. Follow-ups based on Fungus the Bogey Man and When the Wind Blows are also planned. The Snowman is for the 48K Spectrum.



More software on the way for the Sord M5 from CGL.

CGL whets Sord

'Keeping the M5 customer satisfied' has become an urgent priority of CGL, the UK distributor of Sord's micro. Despite an enthusiastic response to the Japanese machine (Issue 12) from the press and retailers, M5 users have until now been somewhat out on a limb.

As part of an intensive 'development programme' CGL has announced plans for more software, hardware add-ons, and support. If you own an M5 your warranty card will entitle you to membership of the new M5 Users'

Club. This free service, primarily intended to keep owners fully up to date with new products, also gives you access to a technical 'hot-line'.

David Morein, CGL's managing director was reluctant to give any details about his new products but M5 Focus, the newsletter produced by CGL, is more forthcoming. A new printer, the PT5, and a 32K RAMpack/extension box are now available with a M5 disk system promised soon.

New software will include games and educational programs.

IBM Piper

By Geoff Wheelwright

The first IBM 'comfortable' with a built-in LCD screen is due for release in the UK this September, five months after its US debut.

It is produced by Semi-Tech Microelectronics — the Canadian company that introduced the luggable Pied Piper Computer last year — and will sell for between \$2500 and \$3000. The 16-bit machine is based around the Intel 80186 chip (which it claims is 8086 and 8088 compatible) and will come equipped with two 1Mb floppy disks as standard (each with a formatted capacity of 800K).

It will also support a 16-line by 80-character Liquid Crystal Display with upper and lower case using true descenders and an electroluminescent backlight panel gets round the problem of LCDs being difficult to read in poor light.

The STM PC will run RGB and composite video monitors and claims to be IBM colour graphics

compatible. In the US it will also come standard with a built-in modem with auto-dialling and a 'hands-free' phone facility. It also comes with a built-in 40-column thermal printer and can do screen dumps of 80-column text.

Standard interfacing includes one parallel port, two RS232C serial I/O ports, a hard disk expansion bus and an IBM PC lookalike bus expansion connector. It uses an IBM-style sculptured low-profile detachable keyboard with a numeric keypad and ten function keys.

The STM PC will also have a collection of bundled software included in the price. Among that software will be MSDOS version 2, Microsoft GWBasic and a word-processor/spreadsheet/filer/database package that will probably come from Perfect Software which wrote the package currently included with the price of the Pied Piper.

VIEW FROM JAPAN



Compatibility trail goes cold in Tokyo

By Serge Powell

'Your assignment, should you choose to accept it, is to investigate rumours that deep in secret laboratories our arch foe, Japan Inc, is about to start cloning the IBM PC.'

This is the kind of job that calls for a Fedora and a cigarette dangling from a stiff upper lip. The upper lip is no problem — outside snow is falling for the first time in 14 years and upper lips are not only stiff, but blue with cold.

On Tokyo's mean streets the first place to look for a lead is the local software pusher. After all, he's the man everybody turns to when they need a quick fix of word processing, database management, or operating systems. He'd know what sort of deals are going down in this town if anybody would.

But you don't get something for nothing, particularly where software is concerned. I crossed his palm with a yen but when that proved insufficient I greased his palm with ten of them and asked him: 'Compatibility?'

Only three worth mentioning, he told me, at least of local manufacture. Hitachi MB-16, Toshiba Pasopia-16, and Sanyo MBC-555.

This didn't seem like a tenner's worth but he didn't have much more. 'There is plenty of OEM work going on for US companies from small and not-so-small manufacturers, but most are blowing a lot of smoke and covering their tracks,' he said.

Well thanks, but no thanks. I decided on a different approach; perhaps the resident chip-heads could come up with some better answers. On asking around I managed to corner the addicted mainframe mainliner of the local IBM User club and questioned him: 'Compatibility?'

Eagle, Compaq, Hyperion . . . that's what they're all talking about. I cut him off; we've all been through that loop before. 'What about local manufacture?' I said. Error trap. 'It's this way. Apart from Sanyo they don't want their brand names to be seen slavishly following the market leader. Besides, having taken so long to catch on to CP/M, they figure the future may lie with CP/M-86 (unless they're shipping something else overseas and not telling us about it).'

There was one final hope in tracking down the cloning laboratories that everybody talks about but nobody knows. There is a Pommy called Mr Big who cracked the retail trade when the Japanese retailers didn't know CP/M from ABC; he moved in with a Z80 machine and cornered the English language word processing market. Brochures, service manuals, advertising material for the export market — big volumes, big money, hence his name. And he did it with a Sanyo.

The chances were good that he'd be doing the same with a Japanese IBM-compatible. I staggered stagily into his shop: 'Clone . . . IBM . . . Japanese?' I gasped.

'Sanyo . . . six months,' he smiled, 'but let me show you . . .'
'Bundled?' I interrupted.

'Not for domestic users,' he said as though dictating to a tape recorder. 'But let me show you a really nice US model . . .'
I fled.

On the way back to the office I tried to piece things together. Basically, the Japanese still don't understand the applications preoccupation of western users. Until they do they probably won't understand the need for compatibility with the market leader.

This is a form of cosmetic high technology and no relation at all to the biological high technology of cloning. And this is what I was going to report until I noticed that a new and anonymous disk had appeared on my desk. I put it into the drive.

'There are rumours circulating to the effect that Japan Inc is now investigating the possibility of a Macintosh-compatible system. Your assignment, should you choose to . . .'

I pulled out the -45 from the drawer it shares with a bottle of whisky and shot the computer in the drives from close range. Enough is enough.

CBM denial

Despite management re-shuffles in the wake of Jack Tramiel's departure (Issue 46) Commodore is unlikely to change its plans to introduce a new range of machines.

Plans are well advanced to launch a new model, codenamed the 264, in the UK around May or June. It will have 64K of RAM and will come with a range of bundled software included in the price thought to be around the £400 mark.

There had been speculation in the US that Commodore was putting back its plans for the 264 until the end of the year.

The speculation was fuelled by the news that following Mr Tramiel's resignation four other senior executives had left the company. Their responsibilities were taken over by Sol Davidson, the company's general manager, who was publicly quoted as saying that Commodore was re-examining the 264 and would introduce the system

'when there is a need for it'.

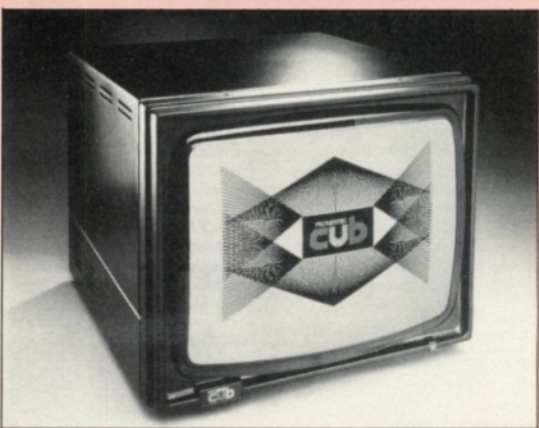
Commodore in the UK was quick to deny the suggestion that the 264 would not appear in the UK until the end of the year.

'There is no change in our plans to introduce the 264,' said John Baxter, Commodore UK's marketing manager. 'We already have machines in the country and have already started to make arrangements for the launch.'

However, he refused to be drawn on just when the machine will be launched and what its specification will be. 'We are making no announcements on what the product will be, how much memory it will have or what the price will be until it is launched,' he said.

There will be a lot of surprises when it is launched,' he added.

Mr Baxter also suggested that the machine might appear in Europe before the US. The need to satisfy FCC regulations on radio interference is holding up the US version.



FUZZY LOGIC — Fed up with the fuzzy display that a Spectrum produces on your TV? Do you have £249 (plus VAT)? You do? then phone 0274 390011 and ask Microvitec about its Cub monitor for the Spectrum. The 1431/MZ comes in a metal cabinet 'finished in matt black to match the appearance of the Spectrum'. Inside is a standard colour monitor with an RGB/TTL input and an additional card carrying an interface tuned to match exactly the TV output from the Spectrum. Of course, you may think that with a monitor costing twice the price of your micro you should throw away the Spectrum and buy a QL. Not to worry, the 1431/MZ will work with that as well.

Hard cache

A Cambridge company, Eicon Research, has come up with a solution to the problem of how to connect several micros to a hard disk without any appreciable loss of access speed.

Called Cache-Net, it combines a hard disk with direct memory access techniques to produce average data transfer rates of 250K per second. Overall, the company claims, Cache-Net is likely to be about ten

times faster than other systems like Ethernet.

The system can handle up to 21 micros and interfaces are available for six different machines including the IBM PC, Apple II and NEC APC.

A system with a 10Mb hard disk, 128K RAM, interface and software costs £2,595 plus VAT. A 20Mb disk with 256K RAM costs £3,255. The company is on 0954 818825.

Toymakers retreat

By Geoff Wheelwright

Toy manufacturers seem to have retreated in droves from the micro business.

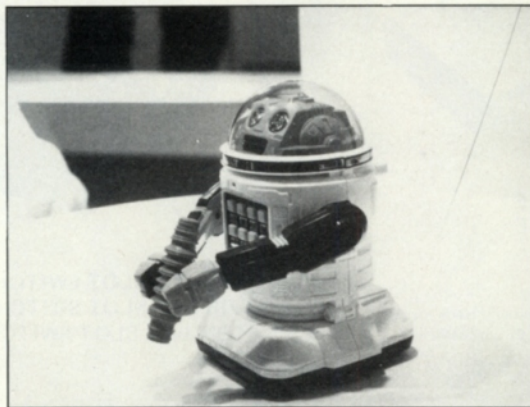
At this year's British Toy and Hobby Fair, several major companies were conspicuous by their absence. Mattel, for instance, has apparently abandoned the electronics field with not so much as one Intellivision unit on show.

At last year's show, the Mattel stand was dominated by the Intellivision games machine and the Aquarius micro. Since then, Mattel has gone through two managing directors and abandoned the Aquarius and, indeed, the computer market altogether. Instead, the company was making much of its new range of Green Goddess Barbie dolls — and the lady whose name will be the draw card on these dolls was there in person to sign autographs.

Conspicuous by its total absence this year was Texas Instruments — which has traditionally brought its Speak and Spell computer learning toys to such shows — and last year was exhibiting the Texas TI 99/4A and the TI 99/2 micro. The TI 99/2 subsequently turned out to be still-born and the TI 99/4A died a swift death late last year when TI announced it was pulling out of the home micro market.

The survivors are Coleco and Atari — which both displayed their new wares at the fair. Atari was touting the new XL range of machines (for more on those see the Atari Micropaedia in this issue) and Coleco aimed to astound the world by showing the Adam home computer system for the first time in the UK (the Adam was exclusively reviewed in PCN Issue 38).

Although CBS Electronics, which distributes the Adam and the Coleco games machine in this country, wasn't willing to give a definite price for the Adam, a spokesman for the company did say the conversion unit for the games machine should be available by the end of next month, and selling for



Tomy's talk-to-me mobile robot advancing while micros go into reverse.

about £499. He also said the stand-alone Adam system would be ready to ship in April at the final UK price of about £599.

The Adam was considered a great price breakthrough when it was originally announced in the US last year as it includes a built-in word processor, digital tape drive, 80K of memory and a daisywheel printer. The machine will also accept all of the Coleco games machine software add-ons, including the conversion box that allows the games machine to run all of Atari's 2600 VCS games machine software.

On the software front, the toy fair produced the first appearance of non-Sinclair cartridge software for the Spectrum. Palitoy UK is importing a large number of Parker Brothers video game titles for the Atari computers and the Commodore 64 — and it has completed development work on Star Wars — Return of the Jedi — Death Star Battle cartridge game for the Spectrum. Though Palitoy would not say how much the Spectrum cartridge software will cost it hinted that it should be available in the shops by mid-summer.

A company spokesman said the



After the Aquarius — Mattel reverts to Green Goddess dolls.



Just for fun - Tomy for tots and a full travel keyboard.

Spectrum was considered a prime candidate for cartridge software conversion because of the number of Interface 2 joystick/cartridge software units Sinclair expects to have sold by the year's end (300,000). If the Spectrum conversions prove popular a number of other Parker games could be converted including Spiderman, Popeye, Frogger, The Lord of the Rings, Q*bert and Reactor.

There may be meagre supplies of software and little hardware coming from toy manufacturers, but the 'computer environment' involved in the toy business seems to be growing by leaps and bounds. For example, Tomy — which specialises in products for young children — released a variety of toys at the show that cannot help but bring home to children the new high-tech environment they live in.

Typical of these was the Tomy voice recognition robot — a £35 R2D2 look-alike which responds to its owner's voice by carrying out one of eight different commands which have it pick up objects, go forward, backwards, left and right, speak and place objects. Also significant in the 'micro awareness' sweepstakes was the Tomy Tutor Play Computer, which uses a plastic 'keyboard' and imitation VDU screen to introduce very young children to alphabets, words and numbers. This micro has no RAM, needs no power and sells for the nominal price of £12. It is in the line of toy cash registers and toy telephones, and with it the wheel has turned full circle.

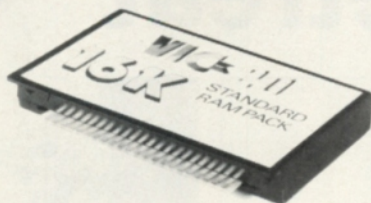


Palitoy plugs in with US cartridge software for the Spectrum.



In the spotlight — Coleco's Adam makes it first UK appearance.

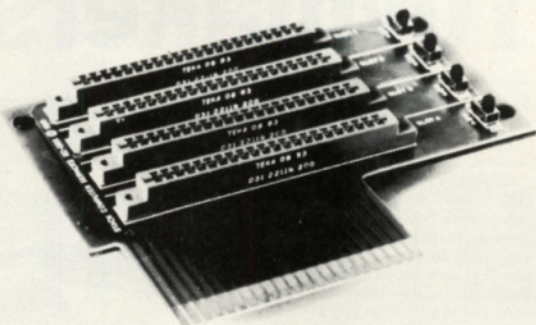
RAM PACKS



- VIC 20 16K STANDARD — £27.95
- VIC 20 16K SWITCHABLE — £35.95
- VIC 20 32K SWITCHABLE — £49.95
- VIC 20 64K RAM PACK — £64.95

VIC 20 and CBM 64 are reg'd trade marks
Commodore Business Machines

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- VIC 20 4 SLOT SWITCHABLE — £28.95
- VIC 20 5 SLOT SWITCHABLE — £34.45
- CBM 64 4 SLOT SWITCHABLE — £29.95

JOYSTICKS

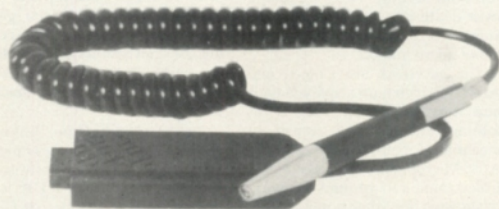


- PRO ACE JOYSTICK — £12.95
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MSDOS now served on chips

After CP/M on a chip (issue 44) it now looks as though MSDOS on a chip will be a reality before the year is out.

Interestingly, the company producing the chip is mighty Intel which also manufactures the 8088 processor chip used in the IBM-PC and IBM look-alikes.

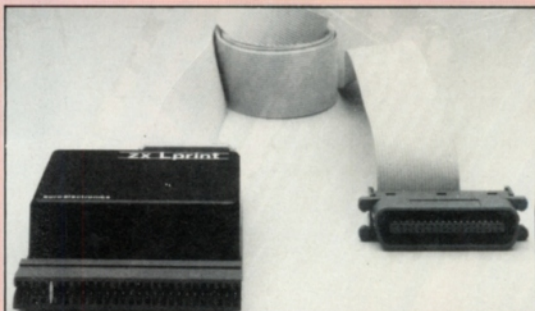
The move by the company puts the final seal on MSDOS's claim to be the standard operating system for 16-bit micros. With the ready availability of the chip and its compatibility with the 8088 and 8086 processor chips it provides manufacturers with an easy route to building a micro to compete with the IBM PC — although the differences between PC DOS and MSDOS may grow as the year progresses.

Having the operating system on a chip avoids the cost and complications of having to build disk drives into a machine.

The main gain for users is that it now makes it possible to build

portable micros using MSDOS that don't need disk drives to function. This time next year we could well see a rash of MSDOS lap-held micros that combine the convenience of the NEC PC-8201A and the Tandy 100 with a measure of IBM compatibility.

At the same time, of course, a parallel wave of similarly-sized machines is likely to be rolling in from Japan, equipped with Microsoft's MSX. Of the candidates for the title of 'standard operating system' the company is strongly represented on home and business systems — MSDOS is ubiquitous in the business field and MSX is being spoken of as a possible standard for home micros despite the fact that so far it is restricted to Japanese micros. Microsoft aims to break this circle in the near future by announcing a European MSX micro manufacturer, and at around the same time it could well name a prominent UK company as a main distributor of MSX micros in this country.



Dual chance — Euroelectronics (0242-582009) has done a nice amount of business, thank you very much, out of its ZX Lprint interface for the Spectrum. Now the company has brought out ZX Lprint III, a printer interface that is switchable between RS232 and Centronics outputs. No extra software is needed to print out text or high resolution graphics as it all comes built-in together with the ability to print in colour using suitable printers. The interface costs £35 and a printer cable £10.

Taiwan rotten Apples juggled

Apple has won an important victory over Taiwanese manufacturers of what have become known as 'rotten Apples'.

As a result of a district court judgement six Taipei businessmen actually face prison sentences of

eight months for breaching the copyright on Applesoft Basic and the AutoStart ROM.

This decision comes a month after the US company won a criminal suit against two other Taiwanese companies, but in that case the sentences were suspended. In the case settled last week the defendants plan to appeal against the sentence and could yet avoid jail.

SOFTWARE

The new releases

Games

BBC, Electron: FBC Systems (0332 365280) is in the process of adapting BBC games to run on the Electron. Valley of the Pharaohs and Star Trader, both at £7.95, will be among the first — the next releases for the BBC are Space Adventure Two and Star Force Lander, the former for £7.95 and the latter for £6.95. Micro Byte Software (06373 6886) has issued an arcade-style 3D game, Space Ranger, priced at £7.95 or £11.95 on disk, for the BBC.

Spectrum: The fur flies in two new games from Artic (0401 43553), both of which feature animals. Monkey Bizness for £5.95 is a kind of Donkey Kong, and Bear Bover is apparently no picnic for £6.95. Islets of Langerhans is an adventure from Amazing Games, Burgess Hill, Sussex; not for the squeamish this involves a journey to the said islets (on the St Pancras line, according to PCN's biology correspondent).

Apple: From the US come Mr Cool and Minit Man, distributed in the UK by Pete & Pam (0706 212321). Mr Cool is an ice-cube — practice your skill at avoiding a melt-down for £24.95; Minit Man is a defender-style game, for £14.55.

Various: Alligata (0742 755005), producer of games for the Dra-

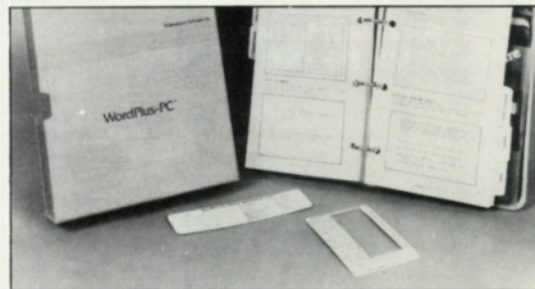
gon, Oric, Commodore and Acorn micros, has published what amounts to a spring catalogue with a new software primarily in the BBC and Electron line. Dambusters and Eagle Empire, both £7.95, are the first offerings for the new year.

Education

BBC: English and maths are the subjects covered by MP Software (051-334 3472) with its latest releases. Password (£11) is designed to teach spelling and comprehension; Cut 'n' Val (£14.50) deals with arithmetic for seven to 16-year olds; Accurate (£11) is slightly more advanced. Ega Beva (0272 710103) has made its first two launches, Jigsaw Puzzle and Sliding Block Puzzle. Jigsaw Puzzle is a memory training exercise. Sliding Block teaches co-ordination and patience. Both cost £9.95.

Spectrum: 3D crops up in education as well as games. Camel Micros has released 3D-Spell for the 48K Spectrum, a game with four levels of spelling difficulty and three levels of game-play difficulty. The price is £5.95.

Oric: Softbacks is a title chosen by a software house at PO Box 257, Watford, to suggest that computers will take over from books, which heaven forbid. The company has two offerings for the



Wordplus-PC — now complete with spelling corrections from Boss.

Oric-1: Story Book, to train young readers or foreign language students, and Picture Book, to develop spelling skills. Softbacks is on 0923 53482.

Business

Commodore: Multiplan, Microsoft's spreadsheet, now runs on the Commodore 64 and will cost users £100. Kobra Micro Marketing (01-997 6666) is the exclusive UK agent for the package on this micro.

IBM: Also from Kobra is Wordplus-PC with Boss, the Built-in On-line Spelling System. Wordplus is reckoned to be one of 70,000 word processing packages in use around the world, but according to US sources it is pushing Wordstar in the popularity

stakes. With Boss the package costs £399.

Triumph Adler: Flexipay 2, a payroll package for the Alphatronic micros, now includes OCR character printing and an Autopay facility. It costs £375.

Epson: Deskmaster 2/D is Kuma's latest addition to the expanding series, putting a word processor on the HX-20 in association with the TF-20 twin disk unit. It costs £49.50; Kuma is on 07357 4335.

Seiko: Intelligence (UK) (01-740 5758) has implemented more than 40 packages ranging from accounting to office automation applications on the Seiko 8600, launched four months ago. The software includes products from Peachtree, Sapphire, Paxton and Graham-Dorian.

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PCN charts

Hardware Top Twenty up to £1,000

TW	LW	MANUFACTURER	PRICE	DISTRIBUTOR
▶1	(1)	Spectrum	£99	(SI)
▶2	(2)	CBM 64	£220	(CO)
▲3	(4)	Sinclair ZX81	£45	(SI)
▼4	(3)	BBC B	£399	(AC)
▶5	(5)	Vic 20	£140	(CO)
▲6	(8)	Atari 600XL	£160	(AT)
▼7	(6)	Oric 1	£99	(OR)
▲8	(9)	Lynx 48/96	£225	(CA)
▼9	(7)	Dragon 32	£170	(DD)
▲10	(12)	TI 994A	£90	(TI)
▼11	(10)	Sharp MZ700	£240	(SH)
▲12	(13)	Atari 800	£300	(AT)
▼13	(11)	Apple IIE	£750	(AP)
▲14	(15)	Sharp MZ80A	£349	(SH)
▲15	(16)	Aquarius	£70	(MA)
▼16	(14)	Colour Genie	£168	(LO)
▲17	(18)	Epson HX20	£472	(EP)
▲18	(—)	Electron	£199	(AC)
▶19	(19)	CGLM5	£150	(SO)
▼20	(17)	Tandy Colour	£180	(TA)

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets up to the end of January. The games chart is updated every week.

Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include V.A.T. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month.

PCN Charts are compiled exclusively for us by RAM/C.

Top Ten over £1,000

TW	LW	MANUFACTURER	PRICE	DISTRIBUTOR
1	(2)	IBM PC	£2,390	(IBM)
2	(1)	ACT Sirius	£2,525	(ACT)
3	(6)	Apricot	£1,719	(ACT)
4	(4)	Commodore 8000 series	£1,200	(CO)
5	(4)	Apple III	£2,780	(AP)
6	(7)	Kaypro	£1,949	(CKC)
7	(10)	Televideo TS-800 series	£1,495	(MD)
8	(5)	HP86A	£1,570	(HP)
9	(9)	DEC Rainbow	£2,714	(DEC)
10	(8)	Epson QX10	£1,995	(EP)

Distributors: AC Acorn ACT ACT/Sirius AP Apple AT Atari BW Brainwave CA Computers CKC CKC Computers CO Commodore DD Dragon Data DEC Digital Equipment EP Epson HP Hewlett-Packard IBM IBM LO Lowe Electronics MA Mattel MD Mideltron OR Oric SH Sharp SI Sinclair SO Sord TA Tandy TI Texas Instruments

Machines: SP Sinclair Spectrum AC Acorn BBC 64 Commodore 64 V20 Commodore Vic 20 81 Sinclair ZX81 DR Dragon OR Oric AT Atari

Games Top Thirty

	GAME TITLE	PUBLISHER	MACHINE COMPATIBLE										PRICE
			SP	AC	64	V20	81	DR	OR	AT	OTHERS		
▲ 1 (11)	Manic Miner	Software projects	*	*									£7.95
▼ 2 (1)	Atic Atac	Ultimate	*										£5.50
▲ 3 (14)	Alchemist	Imagine	*										£5.50
▲ 4 (8)	Chequered Flag	Psion	*										£6.95
▼ 5 (4)	3D Ant Attack	Quicksilva	*										£6.95
▲ 6 (12)	Death Chase	Micromega	*										£6.95
▲ 7 (15)	Hunchback	Ocean	*	*									£6.90
▲ 8 (—)	Stonkers	Imagine	*										£5.50
▲ 9 (16)	Flight	Psion	*										£7.95
▲ 10 (21)	Jet Pac	Ultimate	*			*							£5.50
▲ 11 (18)	Arcadia	Imagine	*	*	*								£5.50
▼ 12 (2)	Lunar Jetman	Ultimate	*										£5.50
▶ 13 (13)	Mr Wimpy	Ocean	*	*									£5.90
▲ 14 (—)	Harrier Attack	Martech/Durrell	*						*				£5.95
▲ 15 (—)	Horace Goes Skiing	Psion	*	*									£6.95
▼ 16 (6)	Valhalla	Legend	*										£14.95
▲ 17 (29)	Hovver Bovver	Llamasoft			*								£7.50
▼ 18 (7)	Kong	Ocean	*										£5.90
▲ 19 (—)	Wheelie	Microsphere	*										£5.95
▲ 20 (—)	Gridrunner	Llamasoft	*	*	*		*			*			£5.95
▲ 21 (—)	Hungry Horace	Psion	*	*			*						£5.95
▲ 22 (—)	Doomsday Castle	Fantasy	*										£6.50
▲ 23 (—)	Fighter Pilot	Digital	*										£7.95
▼ 24 (10)	Hobbit	Melbourne	*	*	*				*				£14.95
▲ 25 (—)	Rev. of Mutant Camels	Llamasoft			*								£5.95
▲ 26 (—)	Kick-Off!	Bubblebus	*		*								£6.99
▼ 27 (3)	Pyramid	Fantasy	*										£5.50
▲ 28 (—)	Birds and the Bees	Bug-Byte	*	*	*								£5.95
▼ 29 (19)	Penetrator	Melbourne	*										£6.95
▲ 30 (—)	Dragrunner	Cablessoft						*					£6.00

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Manic Miner caves in

Yes, yet another letter about Manic Miner but (I am glad to say) off the subject of gaining lives.

I have a way of getting into any cavern from any cavern, without breaking into the program. When it has loaded press Enter as instructed but instead of proceeding through the caverns press in the keys 6031769. There will be no change in the game apart from where the lives are displayed a boot should appear. Then press these keys (all at once), to get to:

- Cavern 1 press 6
- Cavern 2 press 61
- Cavern 3 press 62
- Cavern 4 press 621
- Cavern 5 press 63
- Cavern 6 press 631
- Cavern 7 press 632
- Cavern 8 press 6321
- Cavern 9 press 64
- Cavern 10 press 641
- Cavern 11 press 642
- Cavern 12 press 6421
- Cavern 13 press 643
- Cavern 14 press 6431
- Cavern 15 press 6432
- Cavern 16 press 64321
- Cavern 17 press 65
- Cavern 18 press 651
- Cavern 19 press 652
- Cavern 20 press 6521

At this rate could you call Manic Miner a good, exciting, hard game? *Matthew Durrance, Camberley, Surrey.*

This may be possible, but how many people want to turn this exciting game into sheer tedium? More a bore-wave than a brainwave perhaps? — Ed.

Pirates widen their horizons

I thought you might like to hear about an interesting side-effect to this software piracy business. We have found, in the shop where I work, that display cassette boxes with their printed inlay cards and instructions are mysteriously leaving their shelves. To me this suggests that young people (but is it just the young ones?) are recording their mates' games onto a short computer tape, and then finding the appropriate inlay cards and instructions on display in a local store to give their pirate copy a finishing touch — honestly, it's just not software piracy.

It does get annoying when we end up with cassettes and no boxes. When a customer wants to buy a game we can't offer the box or the instructions, just the tape!

It would be interesting to know if other 'user-friendly micro-dealers' around the country have the same bug.

J Adams, Littlehampton, W.Sussex.

RANDOM



ACCESS

Don't carry a LOAD on your shoulders, unburden yourself on PCN's letters page.

All about Acorn's Teletext Adaptor

I was interested to read Piers Letcher's review of the Acorn Teletext Adapter (Issue 44). I did not have much trouble tuning it in as the tuners were far off their correct positions to start with, but the trick is to go slowly or you can tune through a station before the adaptor responds to it.

A useful feature is that the TFS ROM detects whether the adaptor is switched on before allocating its workspace. If the adaptor is on, PAGE is set at &2400 instead of &1900 (with DFS). This is important since there may be difficulty in running some programs at the higher value, and many Telesoftware programs relocate themselves to &E00 (so save them first).

The manual is well-produced but some features have not been documented. The COPY key will display the full current page number at the bottom of the screen, and O/S commands can be entered by typing the asterisk instead of f5. In Telesoft mode the commands *HON and *HOFF can be used to turn the header line display on and off. This appears on line 1 (you have to be in screen mode 7), but it will move if you cause the screen to scroll.

PCN £10 Star Letter



I cannot go along with the implied recommendation in the manual that the TELEROM is fitted in the right hand ROM socket since (a) you cannot use the auto-start facility (SHIFT/BREAK), (b) you must explicitly select another filing system before running other programs and (c) if you press BREAK during a

program the computer will revert to TFS. My preferred arrangement (if not using a ROM expansion board) is: MOS - TFS - DFS - other - Basic.

I would point out that it is often not possible to type in programs directly off a Teletext TV screen, even if you do have a great deal of patience. This is because some programs have non-printable data embedded in REM statements.

The problem with subtitles and newflashes is unfortunate but the circuitry to do this would further increase the cost of the unit. A cheap monochrome monitor is the answer here, though at the recent BBC Micro User Show one exhibitor was demonstrating a synchroniser and video mixer which would do the job. It can be used for putting titles on home video recordings or for superimposing data.

Finally, there is a slight snag with the method of saving screens described in *Routine Inquiries*. Saving the screen area of memory does not save the contents of the CRT Controller's registers. Therefore it will not restore correctly if you have changed mode or allowed the screen to scroll after saving it. In this situation you must executive the mode statement again before *LOADING the screen.

Richard Porter, Croydon, Surrey.

Piers tells me not all programs from Teletext can be typed in, but the point he was making was that he didn't feel the extra cost was justified by the accessibility of the few programs you couldn't otherwise get — Ed.

Getting BBC screens taped easily

In your answer to Jonathan Loose (*Routine Inquiries*, Issue 44) on saving BBC screens to tape, you suggest reloading a screen from tape with

*LOAD NAME 3000
Provided your screen mode is the

same as the saved screen then
*LOAD NAME
will do the job, on its own.
Wouter Kolkman, Delft, Holland.

Rabbits eggs — yes, we're only human

I enclose photostat copies of pages 88 and 10 of Issue 46. As a compositor I can sympathise, and imagine the deluge of letters and caustic comments.

It's for the unexpected Vic 20, so probably isn't as complex as you'd like, but it does do quite a lot considering the memory it uses.

I used to purchase other computer magazines but, having played the field, now confine myself to the best in spite of the odd misprint or typographical error. After all, it's the content that counts, and that's where PCN scores every time. And again, as PAL2000, (on the very same page), has it we're 'only human' and it does us good to see that others can also drop the odd clanger sometimes.

C Watkinson, Manchester.

Laugh! We could have cried! Thanks to all readers who wrote these 'unexpected' letters. So many of you spotted this that we think it unfair to award £5 for one chosen for publication. But next time we're looking for a proof-reader... Ed.

Sinclair Spectrum price guarantee

Further to Martin Smith's letter (Issue 45) ... my 16K Spectrum cost £125 in March '83. A few weeks later the price dropped to £99. Like others caught in the same situation, I wasn't very happy.

As Mr Smith says, I will be entitled to a cash refund if the computer packs up while still under guarantee.

If this happens, it will be interesting to see the response from the shop when I ask for a refund of £125, buy a brand new 16K Spectrum, complete with a year's guarantee, for £99, and walk out with £26 clutched in my sweaty little hand.

Come to think of it, the keyboard has been acting up a bit lately. Now where did I put that guarantee ...
John Lock, Cardiff, Wales.

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WRITETO: Random Access, *Personal Computer News*, VNU, Evelyn House, 62 Oxford Street, London W1A 2HG.

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Personal Computer News,
VNU, Evelyn House, 62
Oxford Street, London W1A
2HG.

An assemblage of Newbrain peripherals

Q One of the problems with the Newbrain is that it's difficult to get information on hardware and software for it. Could you give advice on what disk drive and other peripheral devices are good value for the machine? In particular, I'm interested in obtaining a good assembler — can you help?

Allan Lewnes,
Telford, Shropshire.

A The Newbrain has RS232 interfaces, so the main difficulty with printers is choosing from the many available. CJE Microcomputers (09062 74998) offers a Star DP8480 upgraded to produce high-resolution graphics. The company includes a listing for a Newbrain screen dump and can supply a Newbrain type printer cable.

Tradecom, the Newbrain's new owner, is busy fulfilling existing orders at present, so most of the Newbrain add-ons aren't readily available. When they do arrive the Newbrain expansion box is a must, if you can afford it. Apart from offering 64K extra RAM it offers an internal printer buffer, enhanced graphics, several interfaces and lots of room for multiple screens.

There are hints of other features in the ones we've seen, but they're still difficult to pin down.

Disk controllers are available now and Angela Enterprises (0438 812439) intends to offer a disk drive which will be cheaper than the official Newbrain one. The ZEN assembler from Kuma (0682 71778) is worth looking at. We haven't tested it, but it's a well established product and has also been implemented on a number of other Z80 machines.

Speaking of add-ons for the Spectrum

Q I am interested in buying a joystick interface for my Spectrum. Some makes have to load a tape before you can use them. Is this the same with the Downsway version? (Monitor,

issue 35) Also, could you tell me if the Currah speech synthesiser will be compatible with many games tapes?

Andrew Clothier,
Co Durham.

A The Downsway programmable joystick interface is a completely free-standing unit, needing no additional software either to program or run. Downsway assures us that all you need do is attach the unit to the back of your Spectrum, a joystick to your unit, and away you go.

Currah's Microspeech system has, in the company's own words, 'charmed its way into the hearts of Britain's software houses,' (but would you let it in with that accent?) Since its launch a good deal of high quality software has appeared offering full compatibility with the speech unit. In addition to the companies mentioned in our review (issue 34) Digital Fantasia, Ultimate, Quicksilver and Incentive all offer titles.

Oric graph-plotting utility formula

Q I am writing a graph-plotting utility for the Oric-1 and have discovered how to POKE an input formula into a DEF FNA(X) line in the program.

My problem is that after the formula is POKED in, the Oric replies with a syntax error report when I try to evaluate the formula using FNA(X).

Perhaps I have to POKE a carriage return or something into the end of the line. Can you help?

Andrew Chard,
Cranleigh, Surrey

A Self-modifying code eh? The syntax error report provides a clue.

Presumably, you're INPUTTING a string, then POKING the ASCII code of each character into the addresses which contain the DEF FN statement.

What you ought to do is to POKE the tokens for the key words like DEF and FN into these addresses — rather than the ASCII series beginning 68,69,70 (ASCII code for the letters D, E, and F).

The way to do this is fairly straightforward. Set up a line towards the beginning of the program (after any CLEAR statements) which reads like

```
this:
20 DEFNR (X)=9 ;
You must leave a fair number of spaces between the REM (apostrophe) and the semicolon. This space is for the function definition to be POKED in later. Don't put a space between DEF and FN.
```

Now add a short routine which PEEKS memory from about 1280 onwards (this is the start address of a Basic program), looking for the number 184 followed by a 196. These are the tokens for DEF and FN. Now look for a 212, this is the token for =. The next address should contain a 39 — the REM. This is the address at which you will start POKING the INPUT formula. This might look something like this:

```
50 FOR I = 1280 TO 1316
60 IF PEEK(I) = 184 AND
   PEEK(I+1) = 196 AND
   PEEK(I+6) = 212 THEN
? "START ADDRESS FOR
  FORMULA IS", I + 7: END
70 NEXT
```

You will have to 'parse' the formula, checking for whatever needs tokenising. For example, the multiply sign (*) has the value 206.

When you have converted the INPUT formula to tokens and numbers, you can POKE them into RAM, starting from the address you found after the = sign. At the end you should also POKE 39 as a REM.

It may be that you have to put the dummy DEF FN statement towards the end of a program and ensure that section of code is actually interpreted by the Basic interpreter before this will work. It all depends how the Oric handles function definitions.

You might consider buying Bob Maunder's excellent 'The Oric Companion' which details exactly how programs are laid out in RAM.

A Brother for your Spectrum

Q Can the Brother EP-22 typewriter/printer be used with the Spectrum 48K? If so, what connections are required to make it work?

H Mackenzie,
Braham, Devon.

A Yes, there should be no basic problem with this, and as the Brother RS232 interface

is of a standard format, you should be able to get a Spectrum to work with all Brothers.

How you do it really depends on the interface you buy. If you want to use Microdrives, put yourself on the Sinclair waiting list for Interface 1. Otherwise, you may prefer an RS232 interface such as the Cobra, but considering the extra features of Interface 1, you'd probably be better off paying the bit extra.

You then need a cable to connect the two. The RS232 socket on Interface 1 is a slightly non-standard 9-pin job, and requests for this tend to provoke shakes of the head from your average micro shop assistant. But never fear, Sinclair produces a cable that should work between a Brother and Interface 1, possibly subject to a slight rewiring job to ensure the DTR connection on Interface 1 is taken to the RTS connection on the Brother.

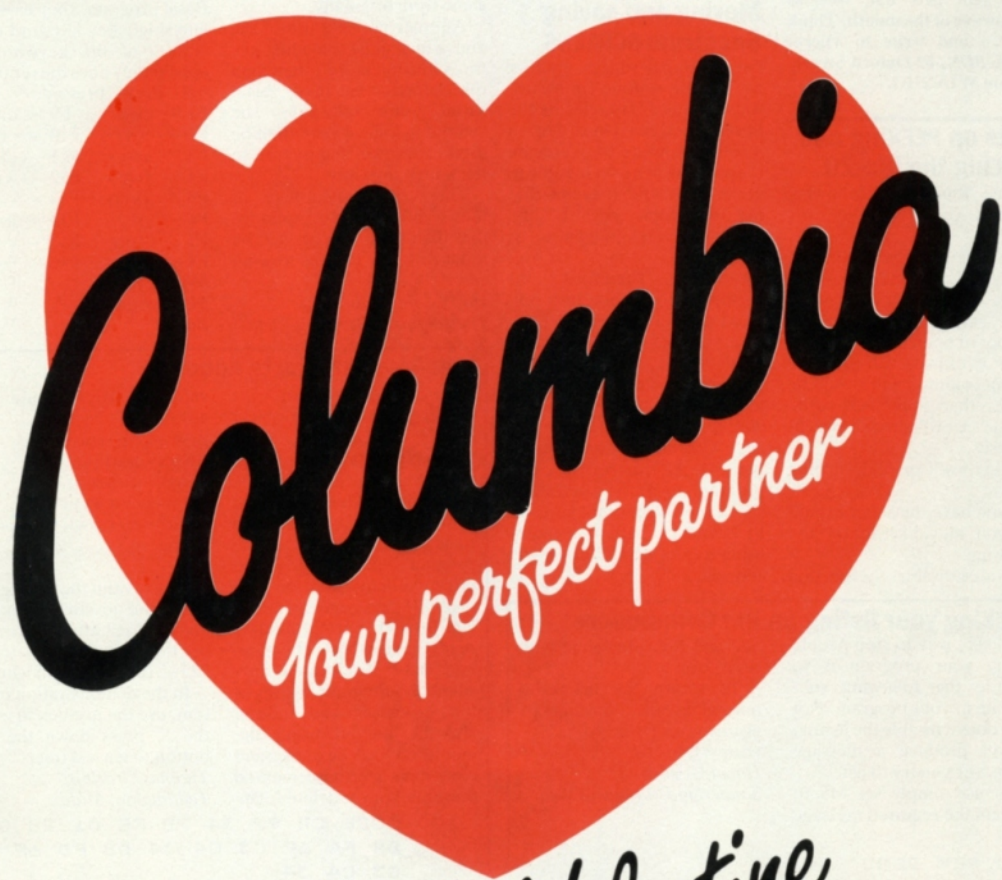
Processing power

Q I would like to ask about the 65C02 microprocessor. The documentation claims to improve a micro using a 6502 processor eg on the BBC micro. Would you please inform me how it could be advantageous.

B Taylor,
Hackney London.

A At first sight this seems to be a good improvement on the original 6502. It has added instructions and consumes a lot less power. A disadvantage is that it may not run at the same clock rate as the standard 6502, although the documentation does say it is 'compatible in every respect'.

One of the subtler methods of software protection used with many processors is to use undocumented instructions that the processor can understand but most disassemblers don't to perform odd tricks. These commands do fairly useless things such as set odd bits of the various registers. For instance the STZ, store zero (&9C) works on most 6502s even though it is not generally documented. This sort of thing could cause problems when using an upgraded instruction set such as that on the 65C02. The only thing to do is to try it and see.



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Hints on PEEKing and POKEing the Vic-20

I have found the following routines very useful on my Vic-20.

PRINT PEEK(183) will give the number of characters in a files name.

PRINT PEEK(186) will give the number of open files.

PRINT PEEK(646) will give the current colour; it will always be one less than on the keyboard. POKE 657,128 will disable switching cases.

POKE 657,0 will enable switching cases.

If you have the super expander you may like to try the following.

SYS 64850 disables the function

Locking your listing on the Commodore

A sneaky way to stop people listing your program is to include the following subroutine in your program. Not only does it disable the listing, it will produce a message whenever you try to list.

To use simply set M\$ to contain the required message

```
10 REM DEMO
20 M$=" SCROOFS IN SPACE 'C'1984"
30 GOSUB 100:LIST:END
40 REM
100 REM DISABLE THE LIST
110 M$=CHR$(157)+CHR$(157)+CHR$(157)+M$
120 FOR T=1 TO LEN(M$)
130 POKE 847+T,ASC(MID$(M$,T,1))
140 NEXT T
150 POKE 847+T,0
160 FOR T=828 TO 837:READ A:POKE T,A:NEXT
170 DATA 169,80,160,3,32,30,171,76,116,164
180 POKE 774,60:POKE 775,3
190 RETURN
```

key definitions. SYS 58232 disables extra commands.

To turn the super expander into a temporary 3K RAM pack type:

```
SYS 64850
POKE641,0:POKE642,4:
POKE643,0:POKE644,30:
POKE648,30:SYS64824
```

Nicky Sloan,
Workington, Cumbria

Moving and saving Spectrum SCREENS

I am writing to suggest another use for the routine (in *Microwaves*, issue 47) to relocate the Spectrum screen. I have written a similar routine to overcome the problem of not being able to verify a picture. It seems that the Spectrum regards the SCREEN\$ in LOAD and SAVE as equivalent to CODE 16384,6912. Therefore the facility to load code in a different section in memory from where it was saved becomes available.

The procedure is as follows:

a) Copy the screen memory to another (protected) memory area with the routine given in issue 41. Alternatively use any program or Basic routine as speed is not important here.

b) Save that part of memory using SAVE "name" CODE strt addr,6912.

and call the subroutine with GOSUB100.

To return the listing to normal, use the following two

```
POKES:POKE774,26:
POKE775,167.
```

David Gristwood,
Sunderland, Tyne and Wear

c) Verify using VERIFY "name"CODE
If the routine wasn't properly verified, repeat steps b) and c) until it is verified. Now that the picture is safely stored it can be easily loaded using LOAD "name" SCREEN\$.

Because of the CODE SCREEN\$ equivalence it is just like loading a piece of code into an area other than where it came from originally.

Another possible use of the above technique is loading pictures into memory other than the screen, that have been saved using SCREEN\$. The routine in issue 47 can then be used to transfer the picture to the screen instantly.

These tips should help all those who fear, like I used to, that their masterpieces will be reduced to an 'R Tape loading error'.

Harry Sohinoglou,
Thessalonika, Greece

The keys to Memotech functions

The Memotech MTX micros have function keys which, apparently, do nothing except return ASCII values from within programs. However, these ASCII values also happen to be tokens for certain Basic keywords. Thus, when typed during the course of entering a Basic program, they can simulate single key keyword entry. Note that the keyword will appear only once the return key has been pressed.

F1 — REM	F9 — CRVS
F2 — CLS	F10 — CLEAR
F3 — ASSEM	F11 — CLOCK
F4 — AUTO	F12 — ATTR
F5 — BAUD	F13 — COLOUR
F6 — VS	F14 — INK
F7 — CONT	F15 — CSR
F8 — USER	F16 — DATA

Mark Cytera,
Mangoisfield,
Bristol

Lynx joystick starts doodling

Here is a useful tip for Lynx owners who have a joystick.

In the ROM there is an un-documented function JOYSTCK, which takes one argument. The following routine allows this command to be used from inside a Basic program. It also gives an effective demonstration of it in use. If the argument is 0 the left joystick port is read, 1 reads the right port. The CODE line can be relocated anywhere in a program, as long as the DPOKE is altered, and can also be put in using the monitor. Once the DPOKE and POKE have been implemented these lines can be deleted. The

values given by the routine are as follows:

```
UP=254 UP+RIGHT=246
DOWN=253
DOWN+RIGHT=245
LEFT=251 UP+LEFT=250
RIGHT=247 DOWN+LEFT=249
FIRE=223
```

To work out the value given when the joystick is moved and the fire button is pressed, use this formula:

223 — (255-direction value).

In the demonstration program, use the joystick to move the *, press down the fire button to leave a trace.

Thomas Griffiths,
Teddington, Middx

```
100 CODE CD 97 34 7D FE 01 28 06
DB FA 6F C3 C4 34 DB FB 6F
C3 C4 34
110 DPOKE &627A,LCTN(100)
120 POKE &6279,&C3
130 CLS
140 LET A=0,B=0
150 PRINT @60,124;"*";
160 REPEAT
170 LET L=JOYSTCK(0)
180 LET A=A+3*((L=247 OR L=215)-(L=251 OR L=219)),B=B+10*((L=253 OR L=221)-(L=254 OR L=222))
190 PRINT @60+A,124+B;"*";
200 IF L>223 THEN PRINT @60+A,124+B;" ";
210 INK RAND(7)+1
220 UNTIL FALSE
```

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Dragon's shrinking disks

Dragon owners have the option of 3 inch disk storage — Brian Cadge looks at Sony's new drives.



Sony 3in disk drives will soon be available from Premier Microsystems for the Dragon 32/64 among other machines, and this adoption of the Sony OA-D33V system by Premier reflects the growing trend towards the new 3in technology in favour of the older 5in.

We Pro-Tested a dual disk drive with the Delta disk interface and Toolkit, all linked up to a Dragon.

First impressions

The drive units measure only 4in by 2in by 5in — a lot smaller than conventional 5in drives and internally much more compact.

The two units were supplied in a plastic housing, also containing the power supply for both drives, but Premier promises that the final production models will be in a metal unit. However, the review casing was nothing to be ashamed of.

The Sony system has many advantages over a 5in drive. One is that the disks themselves are housed in rigid plastic, and a special dust cover is only pulled back to reveal the disk surface once correctly inserted into the drive. These disks are a bit pricey at £52 for a box of ten, but they will take a lot more bashing than the card casing of a 5in disk. The drives are easier to use for someone with little computing knowledge: the disks cannot be inserted wrongly and there are no hatches to close — they

operate very much like a car cassette player.

The Delta interface for the Dragon is not restricted to these drives, in fact it can operate with any drives having a 5 $\frac{1}{4}$ in bus interface. All of the electronics and the DOS are included in an elongated cartridge which plugs into the Dragon's expansion port. Attached to this is a ribbon cable which plugs straight into the disk drive.

Setting up

Setting up the system was a piece of cake. All that was needed was to attach the ribbon cable to the cartridge and turn on, since a mains plug was already fitted.

Documentation

The documentation supplied came in two parts: an 80-page manual entitled 'Using Floppy Disks with the Dragon', which explained how to set up and use the Delta interface, and an A4 ring binder containing the Toolkit manual. Toolkit is an optional EPROM which can be fitted in the Delta cartridge, adding about 60 new commands and functions to the Basic.

Documentation is perhaps one of the most important parts of any system and usually the worst prepared. Thankfully, this is not the case here. Both manuals are excellent, clear and concise. Every com-

mand is explained with many examples. There is even a telephone number to ring if you have any problems. The style and presentation of this literature certainly puts Dragon Data's own to shame — especially compared to Dragon's 'Introduction to Dragondos'.

'Using Floppy Disks with the Dragon' was obviously written for 5in drives, but with production models there will either be a completely new manual or an additional booklet explaining the few differences between 3in and 5in. Premier's own software will also be available on 3in disks.

In use

Three disks were supplied, one demonstration and two blanks. On power up the disk in drive A boots up automatically after pressing any key. Sometimes it's a bit of a bind to always have this function, but it does give the advantage of autostart programs. The demo programs supplied were somewhat disappointing, to say the least, and the only useful feature was the program which gave the syntax and brief explanation of any command entered.

The Delta interface can be configured to most disk drives, and up to four can be chained together. These can all be of different types — it is quite possible to have a 5in and a 3in on the same daisy chain. As for the Delta DOS, which is contained on

PCN PRO-TEST PERIPHERALS

an 8K EPROM, it contains all one would expect from a mini DOS. The usual saving and loading of Basic and machine code are available, as well as merging and chaining of programs. The file handling was very easy to master, and up to eight serial or random access files can be used at once.

Two useful commands are **BOOT** and **BUILD**. **BOOT** allows one command to be executed when a disk is first selected. As this can be the command to run a program, it can be used to produce autostart disks. **BUILD** allows the saving of direct commands on a disk rather than programs. When you access a built file the commands are obeyed as if they had been typed from the keyboard.

The error messages generated by Delta are all in plain English and not in the two letter codes used by the rest of Basic. This is a vast improvement over the Dragon Data DOS which sticks to the code system.

The main use for a disk drive must be file handling, and as I said earlier Delta's file commands are very good. For the most part they don't involve learning new commands, for example the statements **INPUT#** and **PRINT#** are used to read and write to disk files, as with cassette files.

The work area for Delta is the top 1.8K of memory which expands when necessary for file buffers. Unfortunately, using **CLEAR** with Delta running causes the system to crash. Since it is quite simple to prevent the **CLEAR** command working on this memory, this feature should have been included. Another idiosyncrasy that I didn't much care for was that Delta does not tokenise its new commands. This means that, whereas on the Dragon Data DOS the **BACKUP** command uses one program byte, the same command on Delta is stored as the six ASCII bytes.

Included in the Dragon Data DOS are a number of Basic extensions not related to the disks at all — for example automatic line numbering and error trapping. Delta's new commands relate to the disk drive only. However, for an extra £30 you can have the Toolkit EPROM included with Delta which adds practically every command to Basic you can think of.

There isn't space here to cover every one of the 60 new commands in detail, so let's look at the most useful. There is the ability for automatic line numbering using the **AUTO** command, full error trapping and (unlike the Dragon Data system) the ability to resume after an error where the error occurred. You can also disable the **BREAK** key using 'BREAK OFF'. There is a suite of cassette commands to catalogue a tape or merge programs together etc. This may not seem very useful for the disk owner, but as Toolkit is also available separately on cartridge they are worthy of inclusion.

The **GOTO** and **GOSUB** commands have been extended to allow the use of variables such as **GOTO(X+Y-3)**. There is also a much improved trace facility which prints the line number in the corner of the screen without destroying your display, which the built in **TRON** function does. By pressing the shift key you can also vary the speed of a traced program. There are a number of utilities to use on the low resolution

graphics screen (Toolkit has not one but 24 text screens) and options to alter printer output to page output and produce page headings.

The keys A-H can be defined as one or more commands. For example, typing **PROGA"LIST"+CHR\$(13)** would list the program every time shift-A was pressed. The **CHR\$(13)** simulates the **ENTER** key and if left out you get a form of single keystroke command entry.

One of the best features of Toolkit is its full screen editor and program editing commands. The editor is a joy to use and a great improvement on the Microsoft line editor. It allows a new line to be made up of bits of several different lines, a feature the Microsoft editor does not allow.

The Sony drives themselves operated very well, and although not as fast as some 5in drives access times are about on par. Each disk can hold 0.5 Mb unformatted and 368K formatted with 80 tracks. This is the same as an 80-track 5in drive.

Verdict

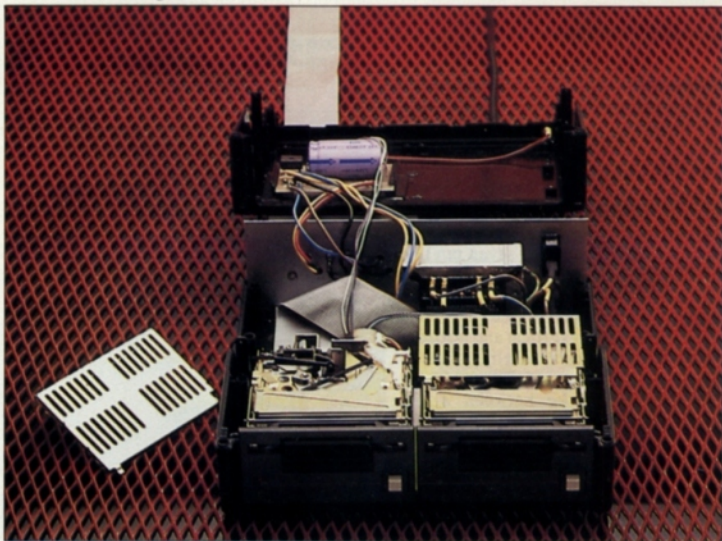
The Delta interface is the only one that is available separately for the Dragon — Dragon Data doesn't sell it without a disk drive. There are pros and cons to both systems. Delta has more disk controlling commands, but lacks the extra Basic functions that Dragondos has. However,

for the extra £30 the Toolkit adds just about every command you're ever likely to want and the only thing it lacks is some sound enhancement commands. Toolkit is worth buying separately on cartridge even if you're not interested in disks.

Why should you go for 3in drives at all? For one thing they are more robust than 5in drives, and the disks are much better. Not only harder to break, but easier to use for beginners too. 3in drives match 5in performance, and in the near future will be cheaper too. In May Sony plans to release the dual-headed version of the drive reviewed here, and this will give you twice the storage again, giving even better value for money since it will only be 25 per cent more expensive than the single-headed version.

The 3in drives can connect with many computers, given the right cables, and for this reason will also be sold as separate units. They should be available within two or three months.

Product Sony 3.5in disk drive, Delta interface and Toolkit **Manufacturer** Sony (drive) and Premier (Delta and Toolkit) **Distributor** Premier Microsystems Ltd, 208 Croydon Road, London SE20 7YX, 01-659 7131 **Prices** Basic drive (expected price) £212.75, two or more drives (expected price) £205.85 each, Delta Interface £120, Toolkit £29.95, Box of ten disks £51.75. All prices include VAT. The system reviewed (Dual drives + Interface + leads) is expected to retail at under £500.



Inside the Premier packaging for the dual unit you can see the Sony drives above — small is beautiful. On the left is the device that gives your Dragon access to all this disk shortage: the Delta interface. This model contains Toolkit, which is also available as a separate cartridge.

MONITORS GO CHEAP

Colour monitors that cost the same or less than colour TVs? David Janda can't believe his eyes.

Only a few years ago, the idea of the average micro user buying a monitor (never mind a colour one), was a rare occurrence. The reason? They were so expensive that only a privileged few could afford them.

But with more and more micros, peripherals and software about, dealers have a tough time trying to compete with each other for our business, and one of the results is cheaper goods for you and me.

Monitors are no exception and one company, Opus Supplies of Camberwell Road, SE London, is offering a deal on a range of colour monitors that you can't refuse.

For £149.95 and £229.95 (both excluding VAT), Opus can supply you with the ECM-1302 1X medium resolution and the ECM-1302 2X high resolution RGB colour monitors, respectively. The monitors are made for Technohome by the Victor Company of Japan (JVC to you and me), and Opus can offer the monitors at such a low price because it has managed to acquire the sole distribution rights.

Features

The 1X and 2X are similar in design with a 14in screen and two controls on the front panel: on/off and brightness. The monitors are housed in cases that are light beige, and enormous. The weight isn't too bad, and they do have a hand grip on the top so they can be carried short distances.

Two types of connector are provided at the back of the monitors: a seven pin Din connector, and a 15 pin connector which will allow Apple 3s to be used.

Also at the back are the necessary controls to adjust the vertical and horizontal hold as well as vertical height. To access these you need a thin bladed screwdriver, which you then poke between a few ventilation slots to make the necessary adjustments. Although the ventilation slots are shorter and wider than the rest, it would have been better if these controls were in the form of knobs; poking around the back of a monitor with a screwdriver is not my idea of fun.

Installation

Two bits of documentation are provided; first there is a small printed manual, and second a couple of photocopied sheets. Comparing the manuals revealed that they were identical in all respects except the serial number of the monitors. Opus assures me that the documentation is being corrected. In the meantime, the photocopied sheets contain the necessary information to get you going.

Connecting the monitor to your micro may not be as easy as you think. No leads were supplied with either monitor

reviewed, so you will have to buy some or make up your own. Either way, have both the connection details of your micro and the monitor handy. This is because not all micros with RGB output are negative sync. BBC owners are lucky because they have a link in the machine that will allow for positive or negative sync. If your micro has a seven-pin DIN connector and it is negative sync, then you will probably have to get a lead made up.

In use

In use the monitors are simply great. If you haven't used a colour monitor before, then you are in for a surprise. Imagine, no more wavy lines gliding across the screen, or 'colour clash' whenever lines or shapes are drawn at an angle. Instead you get a sharp, clear picture.

The 1X (medium resolution) gave excellent results on the BBC, and it was possible to read clearly text in MODE 0. The graphics are noticeably clearer with sharper definition around the edges of shapes and so on.

The same comments apply to the 2X high resolution model, but I stress the points about definition. For the extra

£80 you get another 210 pixels on the horizontal, thus giving more detail in this area. Because there is more resolution on the horizontal, circles tended to have slightly jagged edges.

My one complaint about 2X is that white text on black looked a little 'dirty' and no amount of fiddling could cure this. Other than that all was fine.

Verdict

There is no doubt that the ECM range of colour monitors is excellent value for money. Performance-wise I had very little trouble at all. No overheating was experienced because of the ample ventilation, and there was no loss in quality of picture after long periods.

The main question is: which model? You will have to answer that yourself, but remember that as more and more resolution is available with new micros, the need for a better display will be that much greater.

Item 1302-1 and 1302-2 Colour Monitors
Manufacturer JVC **Price** £149.95 and £229.95, respectively (excl. VAT) **Distributor** Opus Supplies, 158 Camberwell Road, London SE5 0EE, 01-701 8668 **Outlets** Opus

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SLOT PITCH	0.63mm	0.41mm
INPUT VIDEO	RGB ANALOGUE/TTL INPUT	RGB ANALOGUE/TTL INPUT
SYNC	SEPARATE SYNC ON RGB POSITIVE OR NEGATIVE	SEPARATE SYNC ON RGB POSITIVE OR NEGATIVE



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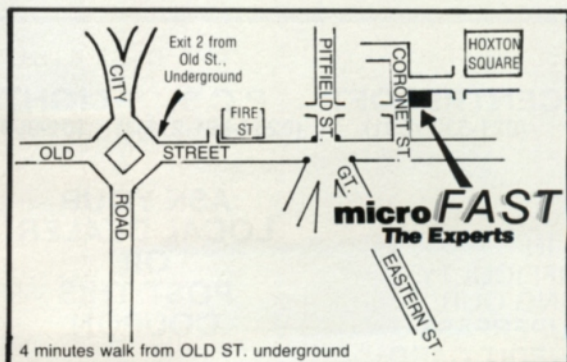
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'The Complete Sinclair Database' by Stephen Adams, Ian Beardsmore and John Gilbert, published by Big Brother Publishing (1984) at £6.95, (paperback, 199 pages)

A complete Sinclair database? Listing all software and hardware you can buy for the ZX81 and Spectrum? It's an excellent idea, but it's one of those notions that are easier to have than to put into practice.

The Complete Sinclair Database kicks off with a fairly extensive list of games and serious software. It would be unreasonable to expect such a list to be comprehensive, but

the comments after each listing tend to be very short, and the way the listings are presented—two per page, mostly—wastes a great deal of space. This means the book covers a lot less software than you'll find listed in many magazines.

The hardware section is considerably more useful, and makes a fair stab at telling you about the whole range of peripherals available for the Spectrum and ZX81. But again it falls down on presentation. The tables look as if they have been produced with a bent felt tip and a typewriter with no margins, and although the information's all there, it's sometimes difficult to work out what you're reading, and what the bits actually do.

Having dealt with this, the book does something I reckon is really bizarre. It launches into a history of Sinclair (both Sir Clive and Research), with reference to competing companies and to — Stephen Adams? Seminal in writing the book, perhaps, but I feel modesty really should have prevailed.

So it's a book that is worth having, and it's nearly worth buying. It's the sort of thing that should really be updated regularly, and if the authors tidy it up while they're doing this, it will be a must for every Sinclair owner. **JL**



'Getting Started with the Texas TI-99/4A' by Stephen Shaw, published by Phoenix at £5.95 (paperback, 150 pages)

Stephen Shaw describes this as a supplement to the standard TI documentation. In fact it contains a wealth of useful hints and

explanations of some of the machine's peculiarities.

The book covers three major areas. It deals with TI products, detailing hardware, a full range of peripherals and software. Mr Shaw also gives his guide to the Basic language, both TI Basic and Extended Basic, following the logical order of the TI manual. And he includes practical advice covering programming tips, maintenance, machine code and additional hardware.

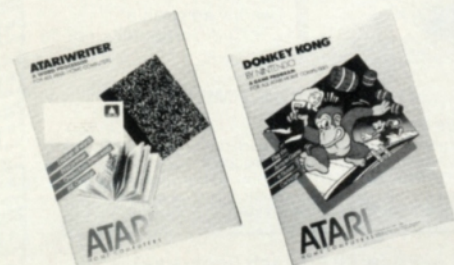
Mr Shaw's style is standard manuaese — short, straight to the point, easy to read and easy to understand. The information is presented in a logical manner with new areas covered as they become relevant. Some sections suffer from lack of illustration.

The main glossary and the index are too small to prove really useful and certain sections of the text appear more than once. The unusually large print enhances readability, but with only 150 pages £5.95 may seem a little costly for the amount of information included. **IT**

6 Ataris and Software



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questions about Atari and its machines.

You had the first questions for this Atari Micropaedia competition last week (they are repeated below along with this week's questions) and next week — in Issue 49 — we'll give you the last two of the six questions that you must answer correctly to have a chance to win, together with a competition entry form. Fill out that form and send it into PCN with your answers.

The first six correct entries drawn will win a micro, the next three will win Atariwriters and the last five will get their choice of Donkey Kong games for different micros.

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Please describe your Computer

Elizabeth Wald's ingenious program sidesteps the Epson HX-20's internal microprinter.

Slipping sideways

The internal microprinter on the Epson HX-20 is a useful device for listing programs and printing results. But it is limited to a maximum of 24 characters per line, which means that program listings are difficult to read and wide program print-out is impossible.

The sideways printing program given in Figure 1 creates the 'sideways printer', which has the device name 'SPT0:' when used in Basic. This uses the microprinter to print out blocks of 16 lines of 80 characters sideways down the paper. A 'cutting line' is printed either side of the text, so that blocks of text may be cut up and pasted together.

The sideways printer is used in Basic by extending the interpreter to include subroutines which control it. Other items, for example disks or a bar-code reader, could also be added in the same way. The collection of subroutines required to control a particular device is known as a device driver.

This actually contains a table known as the device control block. This specifies the addresses of the control subroutines, the device name, and other essential information. The driver is linked to the interpreter via a second table containing the addresses of all the device control blocks. This second table has space for 16 entries of which seven are already defined.

To add any device driver to Basic it is loaded into the lowest end of memory, below MEMSET, and a small loader routine is executed. This loader routine moves all Basic programs and application files down, and copies the device driver into the resulting space at the top end of memory.

Application files are machine code programs permanently linked to the system and are normally linked to the menu. The loader routine then updates various system pointers to protect the driver from being overwritten by Basic, and finally executes a Basic warm start into program area 1. The computer is now in the same state as if Basic had been entered directly from the menu.

When Basic is entered via a warm start it executes an initialisation routine for each linked device in turn. This is contained within the driver, and ensures that the device is marked as being closed, and is also responsible for producing a new 'LOGIN' message. If the sideways printer cannot be initialised, for example if the user attempts to link in more than 16 devices, the normal 'LOGIN' message will be displayed.

Driver subroutines

The sideways printer driver contains subroutines to open and close 'SPT0:' and to transfer a single character to the device from Basic.

Figure 1: Disassembled Machine Code listing

0A40 8E LDS #04AF	0A0D D3 ADD D #6E	0B5E D8 45 78 74 Ext
0A43 7B TIM #4078	0A0F 18 XDX	0B62 65 6E 64 65 end
0A46 27 BEQ 0A50	0A10 A6 LDA A #01	0B66 64 20 45 70 d Ep
0A48 FE LDX 0138	0A12 81 CMP A #45	0B6A 73 6F 6E 20 son
0A48 AD JSR X00	0A14 27 BEQ 0AF1	0B6E 42 41 53 49 BAS1
0A4D 71 AIM #BF78	0A16 4D TST A	0B72 43 0D 0A 77 C w
0A50 8D BSR 0A52	0A18 2B BMI 0AEF	0B76 69 74 68 20 1th
0A52 32 PUL A	0A1A EC LDA D #04	0B7A 53 50 54 30 SPT0
0A53 33 PUL B	0A1C 93 SUB D #68	0B7E 3A 20 62 79 : by
0A54 C3 ADD D #00CE	0A1E ED STA D #04	0B82 20 45 20 57 E W
0A57 DD STA D #6A	0A20 9F 20 BRA 0AC2	0B86 61 6C 64 0D ald
0A59 CC LDA D #07A0	0A22 FE LDX 0134	0B8A 0A 00 25 2C %
0A5C DD STA D #68	0A24 FC LDA D #0CE	0B8E 5F 8F 53 50 *SP
0A5E D3 ADD D #6A	0A26 ED STA D #0A	0B92 44 30 20 00 T0
0A60 DD STA D #6C	0A28 0E CLI	0B96 00 00 00 0C
0A62 FC LDA D #12C	0A2A 4F CLR A	0B9A 70 00 00 8C
0A65 DD STA D #62	0A2C FB FE LDX 8004	0B9E 70 8C 70 00
0A67 FC LDA D #134	0A2E 6E JMP X00	0BA2 00 00 00 00
0A6A DD STA D #60	0A30 DE LDX #60	0BA6 50 0E 46 80 P F+
0A6C 93 SUB D #68	0A32 9C CPX #62	0BA8 00 00 00 00
0A6E DD STA D #64	0A34 27 BEQ 0B14	0BAE 00 00
0A70 18 XDX	0A36 A6 LDA A #00	
0A71 9C CPX #6C	0A38 08 INX	0BB0 86 LDA A #68A
0A73 24 BCC 0A7D	0A3A 0F STX #60	0BB3 81 CMP A #20
0A75 CC LDA D #0605	0A3C 0E LDX #64	0BB5 27 BEQ 0BBC
0A78 BD JSR FF44	0A3E AD STA A #00	0BB7 C6 LDA B #33
0A7B 20 BRA 0AF9	0A40 98 INX	0BB9 7E JMP 8433
0A7D 0F SEI	0A42 DF STX #64	0BBC 8D BSR 0C20
0A7E FF STX 0134	0A44 12 20 BRA 0B00	0BBE 60 TST #13
0A81 FC LDA D #136	0A46 39 RTS	0BC0 28 BMI 0BC7
0A84 93 SUB D #68	0A48 01 NOP	0BC2 62 01M #0013
0A86 FD STA D #136	0A4A 01 NOP	0BC5 20 BRA 0C19
0A89 8D BSR 0B00	0A4C 01 NOP	0BC7 39 RTS
0A8B DC LDA D #6A	0A4E 01 NOP	0BC8 00 ***
0A8D DD STA D #60	0A50 01 NOP	0BC9 8D BSR 0BB0
0A8F DC LDA D #6C	0A52 01 NOP	0BCB 32 PUL A
0A91 DD STA D #62	0A54 01 NOP	0BCC 8D BSR 0C20
0A93 DC LDA D #64	0A56 01 NOP	0BCE 36 PSH A
0A95 FD STA D #12C	0A58 01 NOP	0BCF 60 TST #13
0A98 8D BSR 0B00	0A5A 01 NOP	0BD1 27 BEQ 0BC9
0A9A FE LDX 0134	0A5C 01 NOP	0BD3 32 PUL A
0A9D 08 INX	0A5E 39 RTS	0BD4 81 CMP A #0D
0A9E 08 INX	0A60 00 ***	0BD6 27 BEQ 0C09
0A9F 08 INX	0A62 00 ***	0BD8 81 CMP A #0A
0AA0 A6 LDA A #00	0A64 3C PSH X	0BDA 27 BEQ 0C09
0AA2 81 CMP A #39	0A66 24 8D BSR 0B26	0BDC 81 CMP A #20
0AA4 27 BEQ 0AAD	0A68 38 PUL X	0BDE 25 BCS 0C1D
0AA6 EE LDX #01	0A6A 27 C PSH X	0BE0 36 PSH A
0AA8 09 DEX	0A6C 18 XDX	0BE1 A6 LDA A #14
0AA9 09 DEX	0A6E 03 ADD D #006A	0BE3 C6 LDA B #50
0AAA 09 DEX	0A70 C7 PSH B	0BE5 30 MUL
0AA8 20 BRA 0AA0	0A72 36 PSH A	0BE6 36 PSH A
0AAD 86 LDA A #7E	0A74 38 PUL X	0BE7 A6 LDA A #15
0AAE 47 STA A #00	0A76 C3 ADD D #0020	0BE9 18 ABA
0AB1 FC LDA D #12C	0A78 ED STA D #05	0BEA 16 TAB
0AB4 C3 ADD D #0003	0A7A C3 ADD D #007C	0BEB 32 PUL A
0AB7 ED STA D #01	0A7C 07 STA D #07	0BEC 89 ADC A #00
0AB9 CE LDX #013C	0A7E 33 ADD D #FFA0	0BEE C3 PSH X
0ABC A6 LDA A #01	0A80 ED STA D #0B	0BEF 30 TSX
0ABE 81 CMP A #45	0A82 6F CLR #13	0BF0 E3 ADD D #00
0AC0 27 BEQ 0AF1	0A84 18 XDX	0BF2 C3 ADD D #0100
0AC2 DF STX #6E	0A86 CE LDX #0665	0BF5 37 PSH B
0AC4 A6 LDA A #01	0A88 6D TST #00	0BF6 36 PSH A
0AC6 EE LDX #02	0A8A 46 27 BEQ 0B53	0BF7 30 TSX
0AC8 8C CPX #FFFF	0A8C 08 INX	0BF8 A6 LDA A #04
0ACB 27 BEQ 0AF1	0A8E 08 INX	0BFA EE LDX #00
0ACD 4D TST A	0A90 8C CPX #0677	0BFC 47 STA A #00
0ACE 2B BMI 0AD4	0A92 26 BNE 0B44	0BFE 38 PUL X
0AD0 18 XDX	0A94 38 PUL X	0BFF 38 PUL X
0AD1 93 SUB D #68	0A96 38 PUL X	0C00 31 INS
0AD3 18 XDX	0A98 20 BRA 0B5C	0C01 6C INC #15
0AD4 18 XDX	0A9A 5D STA D #00	0C03 E6 LDA B #15
0AD5 DE LDX #6E	0A9C 32 PUL A	0C05 C1 CMP B #50
0AD7 ED STA D #02	0A9E 33 PUL B	0C07 26 BNE 0C1D
0AD9 6D TST #01	0AA0 38 PUL X	0C09 6F CLR #15
0ADB 2A BPL 0ADF	0AA2 C3 ADD D #0038	0C0B 81 CMP A #0D
	0AA4 18 XDX	0C0D 27 BEQ 0C1D
	0AA6 20 BRA 0B20	

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Choosing a home computer is a bit like playing a video game. The more you play, the better you get. So you'd expect people who spend their working life choosing computers to be pretty good at the game. Quick to shoot down a fault. Pleased when they find an improvement.

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** Which Micro Hardware Review - SpectraVideo SV 318

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Which Micro? Dec 83. **



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The sideways printer requires a 16x80 byte buffer to contain the ASCII codes for one block of text. The buffer is filled when characters are sent to 'SPTØ:' from Basic.

The subroutine which opens 'SPTØ:' fills the 16x80 character buffer with spaces and the device is marked as being open. A horizontal 'cutting line' is then printed. 'SPTØ:' is closed by a subroutine which prints any characters remaining in the buffer and then marks the device as being closed.

The subroutine which transfers a character to 'SPTØ:' places the ASCII code for the character in the buffer. When the buffer contains 16 lines of data, the contents of the buffer are printed out followed by a cutting line. The buffer is then filled with spaces ready for the next block of text.

To print the text block, the sideways printer routine extracts one column of characters at a time from the buffer and converts this to the equivalent 16x6 byte block of dot patterns. This dot information represents six lines of dots on the printer, and these are printed out using a routine in the Epson operating system.

Machine code routines

A listing of the machine code is provided in Figure 1. The program is totally relocatable, but for convenience is listed from location &H0A40 onwards. It is important to remember that when the driver loader routine is executed the machine code is copied to the top end of memory, and thus the addresses given will not be the correct ones. The device driver loader functions as follows:

- 0A40-0A7B** Checks that space exists to link in extended Basic. If space exists then the program branches to 0A7D, otherwise it generates a beep and branches to 0AF9 to return to Basic.
- 0A7D-0A98** Copies all Basic programs and application files down and copies extended Basic into the space created at the top of memory.
- 0A9A-0AB7** Initialises the 'JMP' instruction to link the extended Basic into the interpreter (warm start hook).
- 0AB9-0AEF** Updates the menu entries for the application files.
- 0AF1-0AF7** Resets MEMSET to the value before the Basic loader programs was run.
- 0AF9-0AFE** Jumps to Basic warm start routine.
- 0B00-0B14** Block move subroutine. The device driver functions as follows:
- 0B20-0B22** Warm start hook used to link in further extended Basics.
- 0B23-0B5C** Device driver initialisation.
- 0BB0-0BC7** Opens the device.
- 0BC9-0C1D** Transfers one byte from Basic to the device.
- 0C20-0C28** Calculates the address of the device control block.
- 0C2C-0C3C** Closes the device.
- 0C40-0C50** Fills the character buffer with spaces.

Figure 1 (continued)

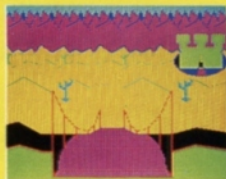
<pre> 0C0F 6C INC X14 0C11 E6 LDA B X14 0C13 C1 CMP B #10 0C15 25 BCS 0C1D 0C17 8D BSR 0C7C 0C19 8D BSR 0C5B 0C1B 8D BSR 0C40 0C1D 39 RTS 0C1E 00 *** 0C1F 00 *** 0C20 8D BSR 0C22 0C22 38 PUL X 0C23 18 XDX 0C24 83 SUB D #0092 0C27 18 XDX 0C28 39 RTS 0C29 00 *** 0C2A 00 *** 0C2B 00 *** 0C2C 8D BSR 0C20 0C2E 6D TST X13 0C30 27 BEQ 0C3C 0C32 6F CLR X13 0C34 6D TST X14 0C36 26 BNE 0C17 0C38 6D TST X15 0C3A 26 BNE 0C17 0C3C 39 RTS 0C3D 00 *** 0C3E 00 *** 0C3F 00 *** 0C40 8D BSR 0C20 0C42 6F CLR X14 0C44 6F CLR X15 0C46 18 XDX 0C47 C3 ADD D #01D0 0C4A 18 XDX 0C4C CC LDA D #0500 0C4E 36 PSH A 0C4F 86 LDA A #20 0C51 A7 STA A X00 0C53 08 INX 0C54 32 PUL A 0C55 83 SUB D #0001 0C58 26 BNE 0C4E 0C5A 39 RTS 0C5B 3C PSH X 0C5C 37 PSH B 0C5D 36 PSH A 0C5E 86 LDA A #85 0C60 8D BSR 0C6D 0C62 8D JSR FF94 0C65 86 LDA A #20 0C67 8D BSR 0C6D 0C69 32 PUL A 0C6A 33 PUL B 0C6B 38 PUL X 0C6C 39 RTS 0C6D C6 LDA B #18 0C6F FE LDX FFD2 0C72 08 INX 0C73 3C PSH X 0C74 A7 STA A X00 0C76 08 INX 0C77 5A DEC B 0C78 26 BNE 0C74 0C7A 38 PUL X </pre>	<pre> 0C7B 39 RTS 0C7C 8D BSR 0C20 0C7E 18 XDX 0C7F C3 ADD D #01D0 0C82 DD STA D #6E 0C84 C3 ADD D #0500 0C87 DD STA D #6C 0C89 5F CLR B 0C8A 37 PSH B 0C8B 5F CLR B 0C8C 32 PUL A 0C8D 36 PSH A 0C8E 37 PSH B 0C8F 8D BSR 0CF8 0C91 DE LDX #6C 0C93 3A ABX 0C94 B6 LDA A 0190 0C97 A7 STA A X00 0C99 B6 LDA A 0191 0C9C A7 STA A X10 0C9E B6 LDA A 0192 0CA1 A7 STA A X20 0CA3 B6 LDA A 0193 0CA6 A7 STA A X30 0CA8 B6 LDA A 0194 0CAB A7 STA A X40 0CAD B6 LDA A 0195 0CB0 A7 STA A X50 0CB2 33 PUL B 0CB3 5C INC B 0CB4 C1 CMP B #10 0CB6 26 BNE 0C8C 0CB8 5F CLR B 0CB9 37 PSH B 0CBA 86 LDA A #10 0CBC 3D MUL 0CBD D3 ADD D #6C 0CBF C3 ADD D #000E 0CC2 FE LDX FFD2 0CC5 08 INX 0CC6 3C PSH X 0CC7 3C PSH X 0CC8 18 XDX 0CC9 8D BSR 0D18 0CCB 8D BSR 0D18 0CCD 8D BSR 0D18 0CCF 8D BSR 0D18 0CD1 8D BSR 0D18 0CD3 8D BSR 0D18 0CD5 8D BSR 0D18 0CD7 8D BSR 0D18 0CD9 38 PUL X 0CDA 38 PUL X 0CDB 8D JSR FF91 0CDE 33 PUL B 0CDF 25 BCS 0CED 0CE1 5C INC B 0CE2 C1 CMP B #06 0CE4 26 BNE 0CB9 0CE6 33 PUL B 0CE7 5C INC B 0CE8 C1 CMP B #50 0CEA 26 BNE 0C8A 0CEC 39 RTS 0CED C6 LDA B #35 </pre>	<pre> 0CEF 31 INS 0CF0 7E JMP 8433 0CF3 00 *** 0CF4 00 *** 0CF5 00 *** 0CF6 00 *** 0CF7 00 *** 0CF8 37 PSH B 0CF9 36 PSH A 0CFA DE LDX #6E 0CFC 3C PSH X 0CFD 3D TSX 0CFE A6 LDA A X03 0D00 C6 LDA B #50 0D02 3D MUL 0D03 EB ADD B X02 0D05 89 ADD A #00 0D07 E3 ADD D X00 0D09 18 XDX 0D0A A6 LDA A X00 0D0C 38 PUL X 0D0D CE LDX #0190 0D10 BD JSR FF67 0D13 32 PUL A 0D14 33 PUL B 0D15 39 RTS 0D16 00 *** 0D17 00 *** 0D18 3C PSH X 0D19 A6 LDA A X00 0D1B 36 PSH A 0D1C E6 LDA B X01 0D1E 37 PSH B 0D1F 3D TSX 0D20 54 LSR B 0D21 54 LSR B 0D22 54 LSR B 0D23 EE LDX X06 0D25 E7 STA B X00 0D27 33 PUL B 0D28 58 ASL B 0D29 49 ROL A 0D2A 59 ROL B 0D2B 49 ROL A 0D2C 59 ROL B 0D2E E7 STA B X01 0D2F 32 PUL A 0D30 A7 STA A X02 0D32 8D BSR 0D40 0D34 8D BSR 0D40 0D36 8D BSR 0D40 0D38 18 XDX 0D39 3D TSX 0D3A ED STA D X04 0D3C 38 PUL X 0D3D 09 DEX 0D3E 09 DEX 0D3F 39 RTS 0D40 E6 LDA B X00 0D42 86 LDA A #20 0D44 97 STA A #68 0D46 4F CLR A 0D47 54 LSR B 0D48 24 BCC 0D4C 0D4A 9A ORA A #68 0D4C 74 LSR 0068 0D4F 24 BCC 0D47 0D51 A7 STA A X00 0D53 08 INX 0D54 39 RTS </pre>
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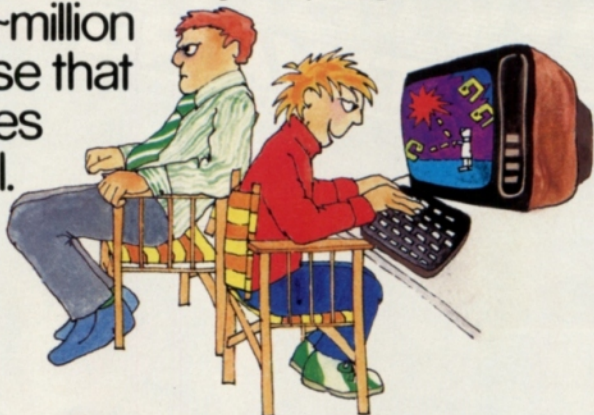


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Spectravideo on view

John Lettice is pleasantly surprised by the Spectravideo 328, but the MSX standard may turn into a millstone.



Waving his glass, he lurched towards me. 'Why don't you lot ever come up to Brum?' he said. 'Why don't you take a look at this wonderful machine we've got? Tell you what, I'll send you one.' Despite my protests that I didn't really want to review a Spectravideo 328, he was adamant and a few days later I found myself unpacking the beast and thinking it might just be good enough to succeed.

The Spectravideo is one of the first MSX machines, and comes in two sizes — medium and large. The 328 reviewed here has 48K ROM and 80K RAM, while the 318 has a rubber keyboard, 32K ROM and 32K RAM. They both run CP/M, though we didn't have the facilities to try this out.

MSX is intended to be a standard operating system for Z80-based micros, and is supported by a number of Japanese manufacturers; the idea is that standardisation will stimulate software development.

But the problem for the advance guard is that it'll still take time for software to be developed, and there's no guarantee that it will ever take off. Because of this there's still a great deal of scepticism about the MSX standard.

Presentation

The 328 comes in a very large box, accompanied by a subsidiary box which houses the dedicated tape recorder, and is just slightly too large for the average carrier bag. A ring-bound beginners' manual — the advanced manual has barely achieved rumour status in this country — is also included, and the review machine came with copious leaflets in Hong Kongese.

Documentation

One promo leaflet sports the howler 'includes features previously thought unspeakable', and the manual has a page headed I/O Pintouts and Memory Mays, but you can generally work out what the manual's driving at.

The manual supplied with the 328, however, was for the 318.

As far as the manual goes, it's the clearest introductory manual I've seen. It's well-illustrated and gives enough information for the beginner to write and understand simple programs by its end. It's loose-leaf, and a nice touch is the graphics screen worksheet. There are, however, a number of errors in the listings.

The pins of the expansion, cartridge, joystick and tape ports are identified, and you also get a list of ASCII codes. But, the manual is only a beginner's course, so if you want more, you'll have to wait until the *Basic Reference Guide* is on sale — our supplier couldn't say when it will be available.

Construction

The SV-328 is around the size of a standard typewriter, and unlike its little brother the 318, has full-travel typewriter keys. The detachable joystick of the 318 has been substituted with and four cursor keys substituted in a cramped position at the top end of the numeric keypad.

The keys are too stiff for my taste, though three days of Frantic Freddy (see Software, below) loosened up the cursor keys a treat. There are five shiftable function keys above the standard qwerty layout, giving you a total of ten functions. Each function key has a function built into

the software, though they're also programmable. There are also two delete keys — the right hand one is a single character backwards delete; the left one deletes blocks forwards.

To the left of the space bar are two extra shifts which allow you access to the 52 block graphics; unfortunately, these aren't printed on the keyboard, which means something of a voyage of discovery.

There are two joystick ports down one side, and round the back are the expansion port and cassette port and cassette port. These are both non-standard edge connectors — the cassette recorder is dedicated, and built like a large brick. Its only merit is that it's dual channel, allowing you to incorporate your own speech, music or mysterious honking noises in your programs.

The bottom and the rear of the machine have large vents, through which an extremely large heat-sink can be seen, which appears to pass directly under the cartridge slot. The temperature in there gets so high I could swear I saw a heat-haze over it. The machine seems to operate happily enough, so just push down the flap and you can warm your fingers in the slot.

The machine is built to take a monitor, but incorporates two good ideas to let you use a TV. The modulator is outside the casing, so all you need do to use a monitor is get the right cable, and the TV cable itself has a switch box so you can leave it plugged in to the TV. Thoughtful details like this one are particularly heartwarming.

Operation

Both the Spectravideos run Microsoft Extended Basic, and very nice it is too. There's a built-in screen editor, a sprite

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command allows easier control of user defined graphics, a double precision maths package — also built in — and banked program switching from Basic. The latter allows you to run two programs at the same time, provided you have the necessary RAMpack, but there's little information about it in the manual.

The 318 alleges 32K ROM and 32K RAM, but 16K of the latter is used for graphics, so you've only got 16K RAM. The 328 has a claimed 48K ROM and 80K RAM, and if you check memory available with PRINT FRE it gives you a figure around . . . 29K? I whipped open the case with vague thoughts that I might find the missing 51K lying around in there somewhere. I then called the distributors.

Apparently there is 80K in there, but 16K of it is for graphics, and 35K is just sitting twiddling its thumbs until you access it under CP/M or Microsoft Basic on disk. The 29K available is comparable to other home micros, but Spectraideo should really put some sort of qualifier into its advertising.

The sound chip on the Spectraideos is operated by what the company calls a Music Macro Language, and responds to the basic syntax PLAY "CEG", where C, E and G are the notes of that name. You can also specify sharp or flat, and can compose on three channels. Three channels of sound come through the TV, and as the chip operates independently of the Z80 it can go its own sweet way while the on-screen action continues.

The DRAW command uses a similar syntax, eg DRAW "U50R50D50L50" — U is up, D down, R right and L left, check? But I still think calling this a Graphics Macro Language is a little overblown. You can also specify colours quite easily in DRAW commands — my only real worry was that the CIRCLE command seems to produce a very pretty ellipse.

The machine has two screen modes, one low resolution and the other 256 x 192. This seems excessively average for a new machine, but the software available does admirable things with what looks at first sight relatively low grade tools. The Spectraideo has 16 colours in all, if you include transparent, and print and background colour can be specified in the same statement. The review machine had an unpleasant screen judder whenever a white background was used, but combinations excluding white backgrounds gave good, static images.

The screen itself is 40 column, although an expansion card is available to give you the 80 columns you'd need for professional work.

Yes, the Spectraideo has a lot of software, and no, it hasn't. The reason for this is that, although the machine doesn't have a great deal of tape and cartridge software available at the moment, it does run CP/M, and therefore in theory at least the whole range of CP/M programs is available for the price of the 80 column card and disk drive.

We didn't have the necessary add-ons to check this out, and there's currently very little information about what will and will not run. The distributor says that it seems

fairly easy to reformat Kaypro software for the Spectraideo, and is currently checking this out, but it may be quite some time before full information is available.

The Spectraideo software, although thin on the ground, is impressive, especially the two cartridges we saw. Cross Force is a particularly graphic and noisy invaders type game, but it was Frantic Freddy that won hearts. You, Frantic Freddy, dodge your way through a blazing apartment building putting out fires and catching cats as they jump from the windows. It's the cats that make all the difference, and if future software is of this quality the machine's success is assured.

There are also a number of serious programs available — this is perhaps a pointer to the micro's crossover status between home and business.

Expansion

Surprisingly, most of the add-ons Spectraideo is advertising are on sale in this country. There's a motherboard expander that sits behind the machine and takes cartridges for modem (unavailable), Centronics and RS232 interfaces, 80 column screen, disk drive controller and 16K and 64K RAM-packs. The whole set-up is housed in a box which is big enough to balance a monitor on.

You can also get 5.25in floppy drives, a printer and a selection of joysticks. The graphics tablet and the Coleco Game Adaptor, which will allow you to play Coleco cartridge games, are not yet available.

The fact that the whole system is being launched at once is highly commendable, but it strikes me as a bit of a liberty to force you to spend £100+ on the motherboard just so you can get hard-copy output. Yes, you've guessed it, the SV-901 dot matrix printer has optional RS232 or Centronics. You can run a single expansion unit with the adaptor but you'll need to plug in the

motherboard if you want to run two or more of them.

The SV-328 is advertised as being expandable to 256K, feverish calculations make that the basic 80K plus three 16K and two 64K RAMpacks, taking up five of your seven slots with memory. But forget all those nightmares about grandmother boards — it's a goof in the advertising copy, and it'll only take up to 144K.

Verdict

As far as the SV-328 is concerned the talk about MSX is really something of a red herring. The machine is good enough to stand up on its own, so it might even be to Spectraideo's disadvantage if the machine's success depended on the MSX standard taking off.

A major problem is likely to be availability. There are very few machines in the country at the moment, and unless supplies increase dramatically there just won't be the user base the machine needs. At £200 the 318 is probably a bit pricey to make much of an impact, but the £300 level of the 328 could make the machine stiff competition for the BBC B, and it could well find a market as a low-end business micro.

But the real threat to the Spectraideo, and indeed to all £300 to £500 micros on the market now or about to arrive, is the new Sinclair QL.

If the Sinclair takes off as its specifications say it should, then machines like the Spectraideo will be in for a tough time.

However, from the range of peripherals, it does look like the Spectraideos have the backing they need to make a dent in the market, and logically, if the Japanese are to make an impact in home computing, they will have to resign themselves to making heavy commitments to machines like these.

As a first try, the Spectraideo is certainly a highly creditable effort, and if there's more where this came from, it's going to be an interesting year.

SPECIFICATION

Price	£302.45
Processor	Z80A
ROM	48K expandable to 96K
RAM	80K (16K of which is graphics support, and 35K accessed through CP/M)
Graphics screen	256 by 192 pixels
Keyboards	87 typewriter style keys
Storage	Tape and cartridge, single sided double density 5.25in floppy drives with 256K unformatted capacity available
Interfaces	Two joystick ports, edge-connector style expansion port
Operating system	MSX
Distributor	CK Supplies, Weston-super-Mare 418838, The Gamekeeper, 021 384 6108
Peripherals	SV-601 Super Expander £113.65 SV-903 Stereo Data Cassette £44 SV-602 Single Slot Expander £14.38 SV-902 Floppy Disk Drive £228.35 SV-901 Dot Matrix Printer £199 SV-805 RS232 Interface Cartridge £67.85 SV-803 16K RAMpack £33.35 SV-802 Centronics Interface Cartridge £67.85 SV-801 Dual disk controller £75.90

*Prices are being revised at the moment and may therefore be 3-6 per cent higher.

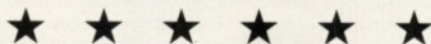
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D'Side 40 Track with PSU 200K	£226.82	£260.84	£5	Stackcontrol	£17.55	£19.95	50p
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800 Revisited

Geof Wheelwright renews his acquaintance with the current top-range Atari

The Atari 800XL is an old friend dressed up in some spanking new clothes.

It has lost some weight and added some style, but inside the 800XL lurks, more or less, an old Atari 800. Like a childhood friend that has gone to college, the 800XL now has a better memory (64K instead of 48K) and has shed the old dual-board design for a slim, new single-board look which is a good deal more attractive.

There is a good deal about Atari's newest machine that isn't so very new — but that's not necessarily a bad thing. It uses the same old Atari Basic, takes the same old Atari cartridges, uses the same old Atari peripherals ports and the now-standard Atari joysticks.

This means that the huge base of disk, cassette and (mainly) cartridge software can be used on the machine with no problems, and that the Atari base of peripherals, including their printers, games devices and storage devices, will plug in easily.

The 800XL, with its larger memory and smaller price (£259), should be competitive with other machines, such as the Commodore 64, at about the same price.

In use

The 800XL keyboard's new high-technology design means the old orange special purpose keys have been turned into flat silver buttons on the machine's right-hand side and a "Help" key has been added.

Though the keyboard layout is much the same, the cartridge slots have been

reduced to the singular. This is no great loss as you really only needed the second cartridge slot on the old machine to plug in Basic, which is now included in the price of the machine.

However, the cartridges are no longer 'goof-proof' — you can take them in and out of the machine while it's still on. On the 800, the machine switched off whenever you opened the cartridge cubbyhole — there's no cubbyhole on this machine and no such protection.

But the real difference between this Atari and its predecessor is an expansion bus. This is where the serious implications of the XL can come into their own with plans afoot for a CP/M module, 80 column card and modem.

The XL also has a better class of peripheral to plug in, with an extensive range of new add-ons including a letter-quality printer, touch-tablet and disk drive — all of which perform a good deal better than the last batch of Atari plug-in peripheral units.

The self-test routine that was so popular on the 600XL also makes an appearance on the 800XL. It tests the memory, the graphics and the sound with programs in ROM, so even if you can't afford any software for your new machine you can still make it *do* something.

The sound and graphics capability of the machine is still superb — even by today's ever-higher standards — and, as always, relies on Atari's custom chips: the GTIA, POKEY and ANTIC. And the traditional screen resolution and colour modes are

preserved: 16 colours at 16 brightness levels through either a composite video monitor or ordinary TV.

Although the lack of an 80-column text mode may seem difficult for serious applications, the capabilities of programs like Atari's Atariwriter word processor and the promises of 80 column cards and CP/M should relieve that difficulty.

Verdict

Another firm step on the Atari upgrade path, the Atari 800XL is a well-built and workmanlike machine that takes advantage of the vast existing Atari software and hardware (peripheral) base while adding enough extras (the smaller size, extra memory and the presence of an expansion bus) to keep essentially old technology alive in a quickly changing market.

This is a machine you don't have to take any chances on; it's an Atari and will do everything you've come to expect of the Atari machines.

Price	£259
Processor	6502C
RAM	64K
ROM	24K
Text screen	16 formats up to 40 × 24
Graphics	16 formats up to 320 × 192
Keyboard	62-key, full travel
Storage	Dedicated cassette unit
Interfaces	2 joystick ports, peripheral socket, parallel bus
OS/Language	Atari Basic
Distributor	Atari International, Slough (0753) 33344



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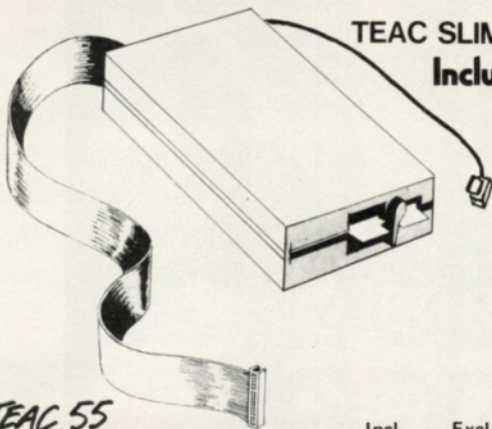
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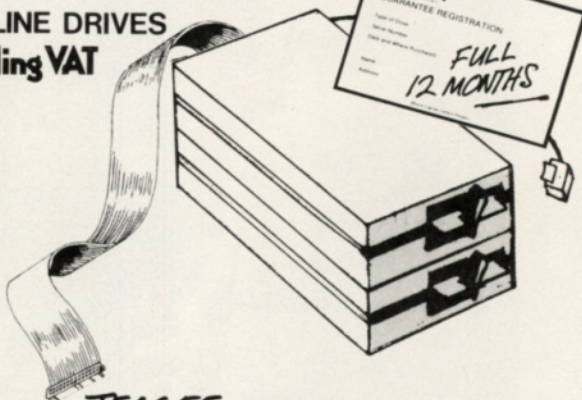
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ATARI

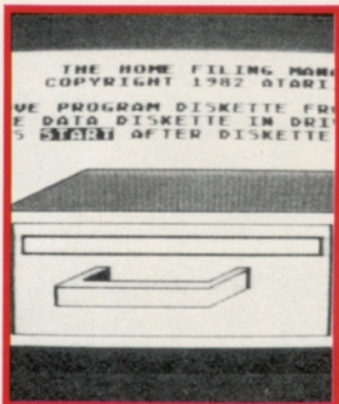
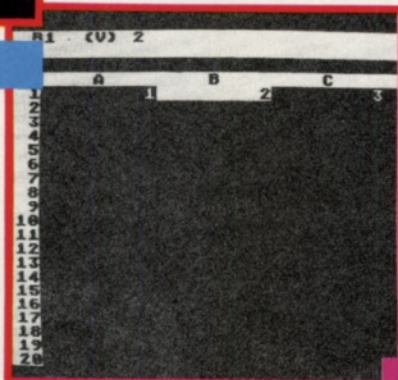
ATARIWRITER

- CREATE File
- DELETE File
- EDIT File
- FORMAT Disk
- INDEX of Disk Files
- LOAD File
- PRINT File
- SAVE File

SELECT LETTER _



Though considered primarily as games machines, the Atari computers are capable of handling all the standard small business applications of computers. For example, the £159 Atari 600XL (above right) can do word processing (above left) using the Atariwriter cartridge, spreadsheets, (centre, using the classic Visicalc spreadsheet package) as well as database management (centre right, using Atari's Home Filing manager program).



Timewise (pictured below) is an appointments and calendar program that will run on both new and old Ataris, though you'll need a system with a disk drive. It will store not only names and dates, but produce an on-screen calendar with the dates for which you have appointments specially marked. Timewise also has searching facilities that accept 'wildcards'.



The old Atari 800 is the only Atari computer to have been produced with two slots for ROM cartridge software, and the Monkey Wrench Basic toolbox program is one of the very few cartridges to use that second slot.

ATARI AIDS IN BUSINESS

Although the Atari is treated as a games machine due to its graphic capabilities, it is actually capable of a lot more. The range of serious applications software shows this, with programs ranging from home management to education and from word processing to spreadsheet applications. Unfortunately, being intended more for businesses, the applications software is more readily available on disk than on cassette, in some cases even requiring the use of two disk drives.

Perhaps the best range of serious packages are the word processors. Although the Atari normally only displays text in 40 columns there are over half a dozen different good word processors available.

Perhaps the all round best of these is Atari's new cartridge, AtariWriter. Also, coincidentally, it is one of the only good packages that will run on the new XL range. This simple to use program allows you to store files on cassette or disk to be printed later.

The Atari Writer cartridge includes all the standard commands of a good word processor, including text movement, word searching/replacing and different formatting of text. AtariWriter also allows you to preview a page as it would be printed on an 80-column printer by scrolling over the page with the screen.

Other comparable programs for use on the old style 800 are Letter Perfect, which offers a good merge facility with its sister program Data Perfect, and Text Wizard, which has a good dictionary program available for it. All of these systems, however, are priced above £50. The Atari Program Exchange offers a simple text editor for a little less.

The official version of VisiCalc is available for the Atari, although the price tag of £150 puts the program beyond the reach of most home users. This incredibly popular program allows you to store various mathematical data at different locations on a spreadsheet and link them together for use in applications such as cost forecasting, estimations etc. VisiCalc is a very powerful business tool and the Atari implementation of it captures all of the best features.

For the budding programmer of the Atari computer various aids and languages are available. If Atari Basic gets you down then you can go for a proper Atari Microsoft Basic with all the standards and commands of official Microsoft Basic as well as additions to cope with graphics etc. Alternatively, if you require a Basic more compatible with Atari Basic, try Basic A+ by Optimised Systems Software. This Basic is upwardly compatible to some extent with Atari Basic and adds various commands and aids.

If you like Atari Basic and just want to make it a little better there are a number of add-ons that

can improve it. Monkey Wrench is about the only available cartridge that will plug into the right-hand slot of an Atari 800 (so it won't work on any of the others), and with Basic plugged into the left slot adds a machine language monitor as well as roughly 20 commands.

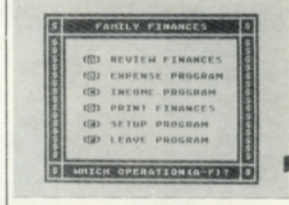
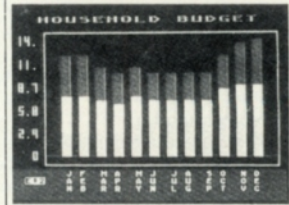
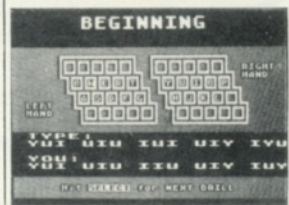
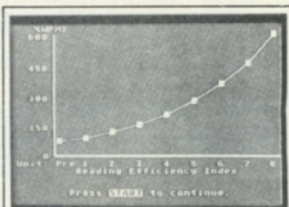
For those without two cartridge slots, or the £50 needed to get Monkey Wrench, there are alternatives. For example, the Basic Commander program by MMG software adds a similar number of commands for about £25, although it is available only on disk. The Atari Program Exchange offers little utilities like renumbering for £10-£15.

If you're totally fed up with Basic and wish to try something else, Atari offers Pascal, Logo, Pilot, extended WSPN (Which Stands For Nothing), extended Fig-Forth and various assemblers. Other companies also offer Inter-Lisp, a Basic compiler, Forth, assemblers, disassemblers, 'C' compilers and Tiny C. Most people will probably plump for an assembler as an alternative to Basic, but it's nice to know that the other alternatives are there. Unfortunately, most of the languages require a disk drive in order to use them, the Pascal even requires two. But languages like Logo, Pilot, Atari's Assembler/Editor and Microsoft Basic are available on cartridge.

Back to the business side of software, there is a series of programs in Basic and Microsoft Basic written by a UK company called Chipsoft. Its programs include a Payroll that will handle up to 100 staff, and integrated Sales and Purchase Ledger programs which include 8 transaction types, 9 VAT rates, invoicing and statements and the possibility of integrating with the Stock Control program. The Stock Control can handle up to 1,060 stock lines with computer generated stock numbers, alpha sorted lists and 9 product headings. Unfortunately all of these packages will require two disk drives and 48K minimum to operate.

Atari also provides a statistics program and a graph producing program as well as a time management one called Timewise. Another area well catered for in applications is filing. Atari's Home Filing manager offers a computerised filing card type system where you can fill up the cards as you please and then search through them for specific phrases, even marking those found with a paper clip. For the more serious user, Filemanager+ offers all the features of a professional database.

As already mentioned, the Data Perfect program can integrate with the Letter Perfect program to provide such facilities as standard letter mailing. A name and address file can be set up using the Data Perfect program and the letter can be written using Letter Perfect.



In addition to the business packages on the opposite page, Atari does a number of 'home' business and business training style packages.

Family finances (top picture) is exactly what you might think it is — a disk-based system to itemise and analyse you family's finances.

Graph II (second from top) is a cassette-based package to graphically display the type of statistics you would calculate using the Family Finances package.

Atari Touch Typing (third) is a cassette-based typing tutor program that helps you improve your typing ability with instant 'feedback' on how you've done in each lesson.

Atari Speed Reading (bottom photo) uses nice graphics plotting and display techniques along with workbook materials to try and boost your reading speed.

AMPLE ATARI LITERATURE

Since all the Atari computers are compatible, books about any one of them should apply quite easily to all the rest.

In this, Atari owners are quite lucky. As Atari was one of the earlier entrants into the home computer market, there are a good many books about the Atari machines already available.

Of course, the new Ataris do have a few enhancements over the older models, but Atari Basic is largely the same throughout and the add-ons are usually interchangeable. The ATASCII character set and sprites are universal throughout the range so that listings on one machine can be typed into another.

There are two major categories of book written for the Ataris: the 'listings' book and the 'how-to-make-the-most-of' book. Not all Atari books would fit into these strict categories, but many fall within their guidelines.

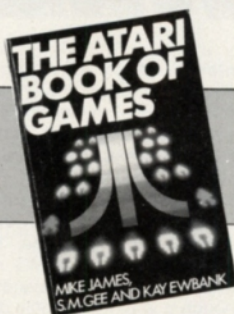


The Atari 600XL Program Book by Peter Goode definitely fits in the first category. It's full of listings that cover a wide range of applications including arcade, adventure and word games, music simulations and business graphics.

Arcade games are taken care of in games like Space City, Cruise Attack, Robot Island, Road Block, Roadrunner and Black Holes. Other varieties of game are considered in challenges such as Dice, Fruit Machine, Flags of the World, Wordgrams and Simper.

In the introduction to his book, Peter Goode says that it was written: because we are aware of the potential of the Atari 600XL we have written a wide choice of programs which make use of the computer's facilities. If you are a games player, you will find ample opportunity to use the colour and graphics while testing your reactions and twisting skills to the full.'

The Atari 600XL Program Book is published by Phoenix Publishing Associates and sells for £5.95.



The Atari Book of Games by Mike James, S. M. Gee and Kay Ewbank also fits into the 'listings' category of Atari books. In the authors' own words, this book contains: '21 games about which two-thirds can be described as moving graphics games. Some of these are variations on familiar themes, for example Invaders, Attack Squash and Bobsleigh. Others have titles that probably don't ring any bells — Sheepdog trials, Commando jump and Across the Ravine'.

'Laser Attack and Mighty Missile are both 'zap-the-enemy' type games with special features that make them very different. Treasure Island is another program that is out of the ordinary. It is a game that tests your memory and relies on a variety of interesting graphics techniques.'

'Capture the Quark is a board game in which you play against the computer on an eight-by-eight grid. There are also some programs for traditional pastimes.'

The Atari Book of Games is published by Granada and sells for £5.95.



Making the Most of Your Atari by Paul Bunn is another book that falls in the 'listings' category — although it does contain a substantial introduction.

In addition to the usual collection of games listings there are also some utilities for the Ataris included in this book. The book claims to include: 'all the essential

information you'll need to improve your programming techniques on the Atari computers.'

'From making the most of the graphics to using sound and the joysticks or paddle, you'll find the vital addresses, the important locations, the programming tricks to get your Atari to do just about anything you want it to do.

'And if you want a generous collection of programs, in ready-to-run form, you'll also find them in this book. From Beetle Juice (you, as a small, red beetle, try to cross a busy street without being squashed) to Dodge 'em (in which you use a joystick to drive your car around a maze, and avoid the computer's car), there are programs for every taste and occasion.'

The book is published by Interface Publications and sells for £4.95.



Learning to Use the Atari 400/800 by Susan Fry is yet another in the Gower look-alike Learning to Use... series for all popular micros.

Here are its claims: 'This beginner's guide really does begin at the beginning. It assumes that you want to learn to use the Atari 400/800 computer in your work or leisure, not become a theorist in computing. Learning to use the Atari 400/800 Computer provides a simple, down to earth, jargon-free introduction to the machine and its software.'

'Many applications of the Atari 400/800 are described, including business, educational and hobby uses. Additionally, a simple and direct introduction to programming the Atari 400/800 is given in a way which will help motivate the user to further investigation of the Atari 400/800's capabilities. The Atari 400/800's ability to produce and draw pictures and diagrams is explored and explained and programs for a large number of graphics applications are presented.'

Learning to Use the Atari 400/800 Computer is published by Gower and sells for £4.95.



Atari Pilot for Beginners by Jim Conlan, Tracy Deliman and Dymax is a very specialized book for the Atari — a book on how to use the machines with the Pilot computing language.

The authors claim: 'With this book you can learn to make your Atari 400 and 800 computers play music, display colourful moving pictures and do mathematics. Discover the new Pilot computer language which is designed to do important things quickly and easily.'

'It is especially designed to let the beginner learn through play and experimentation with computer programming, and all of the programs included in the book were tested by children and beginning adult computer users.'

Atari Pilot is published by Reston Publishing and sells for £11.95.



Kids and the Atari by Edward H. Carlson, is very much a guide for the beginner's beginner. It's divided up into lessons and goes through the business of learning about computers in a very comprehensive fashion.

Here's what the book has to say for itself: 'This book is designed to teach Atari Basic to youngsters in the range from 10 to 14 years old. It gives guidance, explanations, exercises, reviews and 'quizzes'. Some exercises have room for the student to write in answers that you can check later.'

'Learning to program is not easy because it requires handling some sophisticated concepts. It also requires accuracy and attention to detail which are not typical childhood traits. For these very reasons it is a valuable experience for children. They will be well rewarded if they can stick with the book long enough to reach the fun projects.'

That quote is from the Note to Parents—

there are similar notes to kids and teachers at the start of this book. Although it all seems rather serious, the book is filled with cartoons and does take a rather light-hearted look at things.

It's published by Prentice-Hall and sells for £16.95.



Get More From Your Atari by Ian Sinclair is one of those good all-round books that bridges the gap between a 'listings' book and a 'how-to-make-the-most-of' book. Not only are all the regular topics included, but also a smattering of program examples that make things that much clearer.

'This book is aimed at the beginner who has just acquired an Atari 400 or 800, but it should be of considerable service to the established owner of an Atari who has never tried programming. Programming for both models is identical, and the main differences between the 400 and 800 are the keyboards, and the provision of an extra cartridge slot in the 800.'

'Everything in the book, therefore refers equally to both the 400 and 800 computers. I am sure the text and examples will provide a welcome source of information for the beginner. I hope also that the more seasoned user will find much of interest, and perhaps a few welcome surprises.'

The book is published by Granada and sells for £5.95.



Atari Basic by Bob Albrecht, Le Roy Finkel and Jerald R. Brown is one of the better guides to Atari Basic.

First published in 1979, the book takes a lesson-by-lesson learning approach to Basic. The book claims rather simply that it will 'teach you how to write programs using the Basic language, specifically for Atari computers.'

'It is the nature of progress to find ways of improving things, and Basic is no excep-

tion, so you may find that your Basic has some extra statements and refinements that were not in the 8K Atari Basic we used in writing the book. So we encourage you to experiment and, if you get stuck, consult your reference manual.'

'Also, notice that there is an appendix of functions. By chapters 3 or 4 you enhance your understanding of the capabilities of your computer. Learn how to save (CSAVE) your programs on the cassette recorder, if you opted to include one on your computer system. As you progress on to writing longer programs that are developed and modified, having an early version on tape saves tedious typing time.'

Atari Basic is an American book published by John Wiley and Sons and sells for \$10.95 there (UK price will depend on exchange rates).



The Addison-Wesley Book of Atari Software isn't so much of a book as a major reference guide. It has tried to bring together — in a comprehensive list — as many bits of Atari software as possible.

This is how the authors lay out their mandate: 'This 1983 edition of The Book of Atari Software is a software review book for owners of Atari VCS (and the new Atari 5200), Atari 400, and Atari 800 computers, offering evaluations of a wide variety of the programs presently available.'

'Atari computer owners are currently confronted with a bewildering selection of software from which to choose. On one hand, as the owner of an extremely popular microcomputer, you have a rapidly expanding selection of software available. On the other hand, this wide and growing selection of programs presents some problems. The majority of people staffing retail computer stores simply do not have the time to adequately review each new piece of software, nor to track the market in order to tell you what programs might be worth special ordering. Add the fact that a large number of Atari computers are sold in discount houses and department and/or toy stores where the personnel are not normally knowledgeable about computers, then the strong need for a reliable guide to purchasing software becomes even more important.'

The Book of Atari Software claims to be that book. It is published by Addison Wesley and sells for \$19.95 (again UK

We continue our look at some of the keywords available in Atari Basic with the following fifteen words:

LET LIST LPRINT LEN LOCATE NEW ON
GOSUB/GOTO PTRIG OPEN/CLOSE PRINT
PEEK POKE PLOT PADDLE POSITION

LET

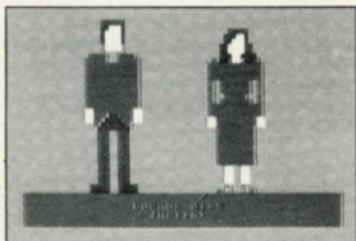
The LET command is used in Atari Basic simply for clarity. The command itself is not actually required by the computer but is included in the Basic to allow the user to write clearer programs. The purpose of the LET command is to tell the computer to change a variable to that which must be specified. For example:

```
LET X=20
tells the computer to set the variable X
equal to 20. This could also be written as:
X=20
but using LET can make understanding the
program easier. Strings can be defined in
the same way:
LET A$="HELLO"
or
A$="HELLO"
```

LIST

The LIST command is probably one of the most commonly used Basic keywords on any machine. Its purpose is to display the contents of a program on the television screen. The program can also be LISTED to a disk or cassette (LIST'C: or LIST'D:), allowing it to be ENTERED later to merge it with another file. LIST'P: will send the information to a printer instead of the screen. The LIST command does not have to show the entire program but can be made to pick out certain portions of the program by specifying a range of line numbers, eg:

```
LIST 10,80
```



will list all of the lines of a program in memory that fall in the range of 10 to 80 inclusive. A single line can be displayed by typing:

```
LIST 70
```

If no lines are within the ranges specified, or if there is no program in memory, then the computer will immediately return with the READY prompt.

LPRINT

The LPRINT command is very similar to

YOUR A-Z OF ATARI BASIC

PRINT (see later) although it sends the output to a printer if one is attached. If the printer is not ready or set up correctly an ERROR 138 message will be displayed. If LPRINT is used on its own the printer will just advance the paper by one line. Some of the formats of the LPRINT command are shown here:

```
LPRINT A$ (Prints out A$)
LPRINT "Hello, this is a message" (Prints the
message between inverted commas)
LPRINT 45+60 (Prints the result)
```

LEN

Sometimes when running a program it is necessary to know the exact length of a certain string. This is achieved in Atari Basic as it is in most Basics, with the LEN instruction:

```
LEN (A$)
or
LEN ("HELLO")
```

In the first example, the number of characters contained within the string A\$ will be returned and can be placed in another variable or used directly. In the second example, the number five will be returned as there are five letters in the word hello.

The LEN function allows the Atari Basic programmer to obtain a number of functions that may be available on other Basics but have not been included in Atari Basic. Atari Basic does not support the keywords LEFT\$, RIGHT\$ or MID\$, but these can be obtained using LEN. The equivalents are shown here:

```
RIGHT$ — B$=INT(LEN(A$)/2),LEN(A$)
LEFT$ — B$=A$(1),INT(LEN(A$)/2)
MID$ — B$=INT(LEN(A$)/2)
```

LOCATE

The LOCATE command is used to find out what is situated at a given position on the screen, eg:

```
LOCATE 20,15,A
```

will place a number equivalent to anything on the screen at 20,15 into the variable A. This command can be used in almost any graphics mode and will either return a number corresponding to a colour or, in a text mode, it will return the ATASCII value

of a character. An example of how to use this command is shown in program 1.

NEW

As with most other computers NEW completely erases the Basic program currently stored in memory. The NEW command will also erase any tables relating to the construction and maintenance of a program such as the variable name table, and arrays and strings are cleared and must be re-defined.

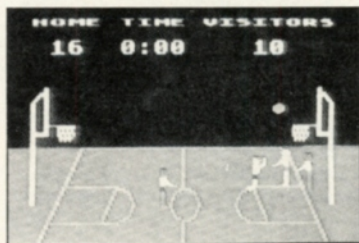
ON GOSUB/GOTO

For a description of GOSUB and GOTO see the first part of this Micropaedia. The ON GOSUB/GOTO combinations add a lot of power to the use of these keywords. In a program the combination might look something like this:

```
ON X GOTO 100,200,250,400,600
```

The variable X is used to select which of the line numbers in the list following the command the program will GOTO or GOSUB when this line is executed. The variable must be positive and the number is rounded to the nearest whole number by the computer. If the number is 0 or is greater than the number of line numbers in the list the control of the program moves on to the next statement in the program.

If the ON GOSUB combination is used the program will go to the routine specified and then, on encountering a RETURN command, will return the program to the statement immediately following the ON GOSUB statements. An example of the use of these commands is given in program two.



OPEN/CLOSE

The OPEN command is used to 'open' a device (such as the cassette/disk or the screen), so that it can be directly accessed and controlled from a Basic program. The OPEN command requires four different parameters to be specified. These are shown below:

```
OPEN num,num,num,filename
```

The hash symbol '#' is obligatory and is used later to access an OPEN file. The first number can be between 1 and 7; this simply names the file for later reference. The second number determines the type of file that is being opened.

Different types include: READ only files, WRITE only files, READ/WRITE files and so on. The third number is only used in special cases (ie sideways printing on the old Atari printer). For most applications this number is left as 0.

The filename tells the computer exactly what device you wish to use. Some of the options here include C: for cassette data files, D: filename for named disk data files, S: for direct access to the screen handler, P: for access to a printer, R: for access to the serial ports on an Atari interface module and K: for direct access to the keyboard handler.

Before a file can be opened it must first have been closed by one of a few commands available, ie RUN, CLOSE, END etc. The CLOSE option will close a file that has previously been opened and will generally tidy up any loose ends. OPEN and CLOSE are demonstrated in program two.



PRINT

The PRINT command must be one of the first commands any computer owner must learn on first contact with his machine. PRINT simply displays information on the television screen. Some of the most common uses are shown here:

```
PRINT X+2*3;W
PRINT "Hello"
PRINT #6;"Hello again"
print #1,a$
```

In the first example the PRINT command is being used to work out a maths question using numbers and variables, the result will be displayed on the screen. Example two is one of the most common usages of this keyword, to display information enclosed by quotation marks. Information printed in either of these two ways will be shown in the text portion of a split-screen display or on graphic 0 screens only.

The third example outputs the information to the graphic part of a split-screen mode and has little use in mode 0. In modes 1 and 2 this format is used to print large text in the graphic area and using upper/lower case and inverse combinations provides text in four colours. If PRINT #6 is used in a drawing mode the ATASCII values of the characters used are translated into colour values which are then placed on the screen.

The last example shows the use of PRINT to output information to a previously OPENED file. PRINT statements followed by commas format printing to predefined column positions on the screen. Following commands with semicolons (;) prints pieces of information directly after each other. Use of PRINT is shown in programs two and three.

PEEK

The PEEK command allows you to find out what value is in any specific memory location. To use this command you must supply the memory location you wish to look at in brackets. The value stored in that location can then be stored in a variable or used in a calculation of some sort or printed etc. Using this command, for instance, you can look at locations used by the computer to store different information such as colour values, error codes and line numbers causing errors. The use of PEEK is shown in program three.

POKE

POKE is virtually the opposite of PEEK. Using this command you can change the value stored in a specified memory location. Each location can contain a number from 0 to 255 and POKEING a number greater than 255 into a location will result in an error. Memory locations within the operating system ROM cannot be changed but can be looked at using PEEK. An example of the use of POKE is shown in program three.



PLOT

PLOT is used to place a point on a graphics screen, the colour of which will have already been determined by the COLOR command (see Micropaedia last issue). After a point has been PLOTTED, the graphics cursor will remain in that position unless moved by another PLOT command or DRAWTO.

PLOT can be used in text modes to place characters on the screen; the letter printed must be selected by using its ATASCII value with the COLOR command. Use of this statement is shown in program five in last week's Micropaedia.

POSITION

The POSITION command is a bit like PLOT, except that no point is plotted on the screen at the location where the command moves the cursor. Usually used in mode 0, this command can determine the next position on the screen where text might be printed. The cursor itself will not move until a PRINT or PLOT command is executed.

As with all Basic commands this rather long statement can be abbreviated to POS. When the program is LISTED, the command will be printed out in full.

POSITION is used very often in text modes to format the layout of text on the screen and to place text outside the normal margin limits.

An example of this is given in program three.

PADDLE

There are two main types of game controller commonly used on the Atari. Most popular is the joystick with eight directional movements and a fire button. However, the paddle controller provides the Atari owner with a totally different form of control.

The paddle is a small knob mounted on a base which also houses the fire button. Two paddles are connected to each controller port which means that up to eight players could use paddles at once on the 400 and the 800. To operate the paddle the knob is rotated clockwise or anti-clockwise and this movement will produce a number between 0 and 224 which can be checked by using the PADDLE command such as:
X=PADDLE(0)

Paddles work in a similar manner to potentiometer joysticks. Turning the knob varies the voltage of the current moving through and the computer can sense the changes.

The paddles are numbered 0 to 7 from left to right. Many games use this number to directly position the player's object on the screen.

PTRIG

As mentioned in the PADDLE description, each paddle controller has a fire button. In order to check whether or not the fire button has been pressed the PTRIG command is used. With the same format as the PADDLE command, the PTRIG command will produce either a zero or a one. If the value is 1 the button is not being pressed, but if the value is 0 it means the button is being held down.

If you have a pair of paddle controllers plug them into port one (the leftmost port on your computer) and type:

```
FOR T=K1 TO 10000:PRINT PADDLE(0),
PTRIG(0):NEXT T
Moving the paddle and pressing the button on paddle 1 should vary the numbers.
```

REM

The REM statement is only supplied for the user's convenience. When the computer encounters a REM statement within a program it simply ignores it and continues the execution of the program at the next sequential line number. Although the REM statement need not necessarily be the only command on a program line, it must be the last one due to the computer ignoring information after REM.

The idea of REM is for the user to label the program and add comments that will aid in the editing or updating of the program at a later stage. The statement is used in most of the demonstration programs to explain what each command is doing.

Program 1: LOCATE command

```
10 REM DEMO PROGRAM 1 - LOCATE
20 GRAPHICS 0:DIM B(5):REM SELECT MODE A
ND SET UP SIMPLE ARRAY
30 POSITION 12,12:?"HELLO":REM PLACE SO
METHING ON THE SCREEN
40 FOR T=1 TO 5:REM START LOOP
50 LOCATE 11+T,12,A:REM READ INFO FROM S
CREEN
60 B(T)=A:REM STORE INTO ARRAY
70 NEXT T:POSITION 16,12:?"CHR*(A):REM E
ND LOOP AND RESTORE LAST CHARACTER LOOKE
D AT
80 ? .? :FOR T=1 TO 5:?"CHR*(B(T)):NEXT
T:REM DISPLAY CONTENTS OF ARRAY
```

RUN

The RUN command is used mainly to start the execution of a program that is currently in memory. It can also be used with a filename to load and run a program from cassette or disk automatically. The command is normally used in immediate mode to start off a program, but it can also be included within a program to restart it.

When the computer encounters RUN it clears all variables and all files that have previously been OPENED are closed. Any sounds are turned off and strings and arrays are wiped clean. RUN can only be used to start a program going from the first line. If it is required to start at any other line besides the first then the command GOTO must be used. If it is required that the effect of RUN is implemented but the program still must not start at the first line then the first line could be changed to be a GOTO statement that jumps to the desired starting position.

RESTORE

RESTORE is used to reset pointers that are used with DATA statements (see READ). As the Atari gets information from DATA statements within the program, a pointer is incremented to show where the next item

Program 2: gosub and RETURN commands

```
10 REM DEMO PROGRAM 2 - ON GOSUB/GOTO AN
D OPEN/CLOSE
20 ? "ENTER A NUMBER FROM 1 TO 3":INPUT
A:REM GET A NUMBER
30 ON A GOTO 50,60,70:REM CHOOSE ONE OF
THREE PLACES TO GO
40 GOTO 20:REM START AGAIN IF A BAD NUMB
ER IS ENTERED
50 ? "ENTER ANOTHER NUMBER, EITHER 1 OR
2":INPUT B:REM NOW ENTERING A NUMBER FO
R THE SECOND TEST
55 ON B GOSUB 80,90:REM GOTO A SUBROUTIN
E ACCORDING TO THE NUMBER SELECTED
57 RUN :REM RESTART PROGRAM ON RETURN OR
MISTAKE
60 ? "THE PROGRAM WILL COME HERE IF YOU
CHOSE A 2 TO START WITH":REM SECOND GOT
O
65 RUN :REM RESTART PROGRAM
70 ? "YOU CHOSE 3":RUN :REM THIRD GOTO
80 OPEN #1,12,0,"D:TEST.DAT":RETURN :REM
OPEN A FILE TO AMEND A DISK DATA FILE
90 CLOSE #1:RETURN :REM CLOSE PREVIOUSLY
OPENED FILE
```

should be read from. During the execution of a program it is sometimes required to restart the READING of information at a position other than where the pointer currently is. RESTORE on its own will start the pointer back at the first DATA statement in the program, but a different DATA statement can be specified by adding a line number to the RESTORE keyword.

READ

READ and DATA are used together to enter information into a program. The DATA statement can be situated anywhere in the program, but there must be as many elements in a DATA statement as there are calls through the READ statement.

The best way to understand the use of these commands is by looking at program one. The DATA statement can have as many variables as can fit on a single line but each one must be separated by a comma. The READ command will read a piece of information from the DATA section and place it in the variable specified with READ.

Micropaedia editor: Geoff Wheelwright
Design: Nigel Wingrove
Contributors: Richard Hawes

NEXT WEEK

We continue our indepth look at the Atari machines with an examination of add-ons and plug-ins including the new range of peripherals.

You'll get a chance to see the new trackball, printers and storage devices — as well as find out about some of Atari's future plans. And in two weeks we begin a special investigation of the workings of printers.

RND

Inside the Atari computers, and indeed, most others, there is a random number generator. The use looks like this:
 NUM=RND(0)

A number between 0 and 1, but never actually 1 itself, will be placed in the variable NUM. If you wish to get a higher random number you simply multiply the number obtained by the maximum number you wish the computer to give you. The zero in brackets after RND is a dummy variable and can be any number.

STOP

STOP is rarely used in a final program but is very useful when writing and debugging programs. When used in a program the STOP command will cease execution of the program and display a message telling the user what line the program stopped at. This command will not close any open files or cut off sounds or destroy any variables. The program can be resumed at the next line number by typing CONT and pressing Return.

Program 3: PEEK and POKE commands

```
10 REM DEMO PROGRAM 3 - PEEK POKE AND PO
SITION
20 GRAPHICS 0:POKE 82,10:?"REM SELECT M
ODE, GET LEFT MARGIN TO 10
30 ? "LEFT" RIGHT:REM SHOW PR
INTING USING THE PRINT STATEMENT (ABREVI
ATED TO ??)
40 POSITION 0,6:REM START PRINTING OUTSI
DE THE USUAL BORDERS
50 ? "OUTSIDE":REM TEXT APPEARS WHERE PR
INT STATEMENT CANNOT PLACE IT
60 POSITION 0,8
70 ? "THE MARGIN"
80 ? "PRESS RETURN TO CONTINUE"
90 IF PEEK(764) < 255 THEN 110:REM CHECK
THE LOCATION THAT READS THE KEYBOARD TO
SEE IF A KEY IS PRESSED
100 GOTO 90:REM IF NOT RETURN TO PEEK AG
AIN
110 END :REM STOP PROGRAM WHEN A KEY IS
PRESSED
```

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THIS'LL LEARN YOU

Some educational programs are not all in the same class.
Colin Cohen puts a few to the test



Mitzi James

Publishing educational software is much like any other educational publishing — if it's to be of any use to the end user (old-fashioned parents call them children) it has to embody both sound educational ideas and sound publishing practices. In the case of computer programs everyone is still very much feeling their way and as a result it is often easy to confuse novelty with a good idea. This won't last long as the novelty soon wears off, and anyway the kids are not as likely to be impressed by gimmicks as their elders.

Many programs now available can be used by primary school children with the minimum of adult intervention, but the child can easily be confused by the different conventions observed by different publishers, which means that programs differ within a series.

Mr Men

A case in point is the first of the Mirrorsoft programs I saw — First Steps with Mr Men which is followed by Quick Thinking and Caesar the Cat. They run on the Spectrum and Commodore 64 as well as the BBC B. Mirror Group Newspapers have done more than just buy big names and merchandise them as computer programs, but they still missed some opportunities.

Apart from the technical instructions there is a little 'Mr Men' booklet (by Richard Boulton and not Roger Hargreaves) for the adult to read aloud. It contains four stories (there are four programs on the tape) and each is written in a relaxing style. One would be quite happy to read them without the accompanying programs as there are little coloured drawings which mirror the screen displays.

So what are my reservations? Well, the instructions say that you need the short program name to *CHAIN*™ the program, when of course it is not needed as the tape itself shows. There are two programs on each side of the tape and one is told to <CTRL> <BREAK> and *CHAIN*™ to get to the next program. Surely a single key should be used for this?

On the face of it is also a nice idea to give the child a cardboard strip with four coloured and pointing Mr Clevers to fix above the function keys. Unfortunately the directions in which they are pointing are not that clear, nor is it immediately obvious which four function keys of the ten they refer to. My five year old would certainly have preferred the simplicity of the normal cursor keys to steer the cursor.

Often, even in the best regulated programs, the child can find its operation simply too complicated. Under these circumstances (which do not really apply to Mr Men) it is nice to have an easy reward for the child. In the case of Mr Men two of the programs allow you to change the background colour just by using <TAB>, and in one case <CTRL> changes the foreground colour. The effect is very dramatic and rewarding as it cycles through the colours and its pleasing to get 'something for nothing'.

The games themselves are quite simple — two do little more than teach eye and hand co-ordination. In the first game Mr Greedy has to be directed at an ice cream, and each time the child succeeds the steering is made more difficult by added obstacles. In the second game only one of the keys is used, but even a five-year-old can still keep it pressed too long. The Mr Forgetful games are a form of pelmanism in which the child has to remember what is hidden in which cupboard — a good deal more difficult than the eye to hand co-ordination of the first two games. The animations of the Mr Men figures are a real pleasure, as is the hornpipe that is played as a reward!

Ollie Octopus

Ollie Octopus comes from Storm Software and in Amazing Ollie he (or is it she?) has to be steered round a maze. I have taken it on trust that a billion different designs are possible. The octopus goes collecting fish round the maze which has a reassuringly solid feel if you make a wrong turning. In one version the fish are then re-displayed at

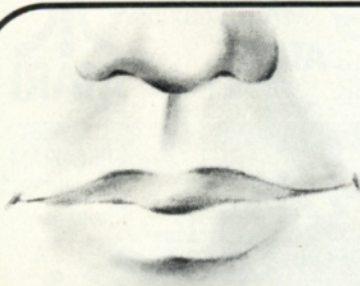
the side with one larger fish representing the tens, which introduces the child to tens and units. Two further versions allow one to play against the clock or blindfold. Both are much too difficult for primary children, but the program does claim to be for the whole family. I'm not at all sure what is the point of steering round a maze which has not been drawn as I don't believe that it is possible to create in the mind and then memorise anything but the simplest maze.

Ollie Octopus' Sketchpad is intended for five year olds, but would be better regarded as an introduction to colour graphics for all ages. The cursor keys cannot be used as there are eight possible directions for which the function keys are used, while another cycles the colours. C draws a circle, V a square and B a triangle, + and L make them bigger/smaller, D is for disappear and S for shade: what logic is there in this choice?

There is a very neat demonstration program in which Ollie draws the cassette cover. It is well worth watching several times as it shows very clearly how you can create quite complex images from basic shapes. Apart from the choice of control keys the program is remarkably simple to use — more than can be said for some other paint programs, though it would probably be even easier for a child if the joysticks were used instead of the function keys for some purposes. And why, oh why is there no printer dump?

Not everyone has a printer it is true, but surely no graphics program can be complete without one.

First steps with Mr Men (£8.95) Primer Educational Software, BBC (Spectrum soon)
Quick Thinking (£6.95) Wigit Software, Spectrum/64 (BBC soon) **Caesar the Cat** (£8.95) Andromeda Software, Commodore 64
Publisher Mirrorsoft **Outlets** Mirrorsoft, Holborn Circus, London EC1, 01-822 3580/00 (Retail)
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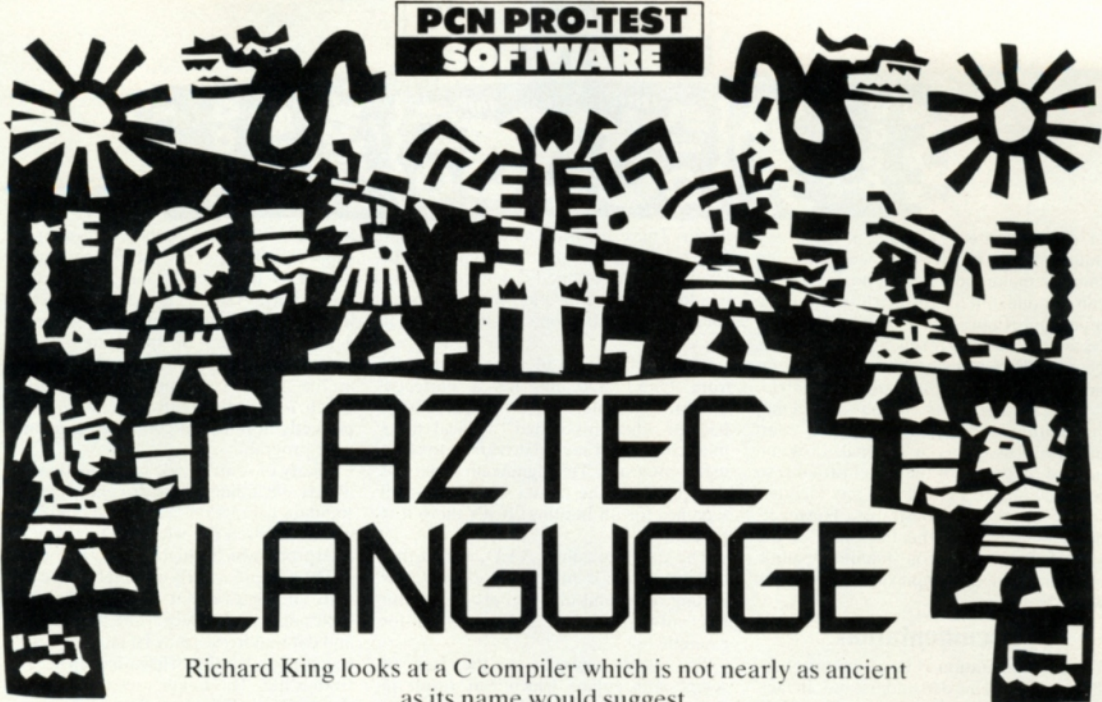
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AZTEC LANGUAGE

Richard King looks at a C compiler which is not nearly as ancient as its name would suggest.

Aztec-C is a new (to the UK) version of the justly-famed C language. It's been available for about a year in the US, during which time some minor bugs have been eliminated and the system has been upgraded a little.

Aztec-C, now in Version 1.05b, is largely complete and so should be stable for some time. It is a direct competitor to other systems-development packages including UCSD p-System and other Cs, some of which have been around for quite a while, but it's generally superior to most. Aztec-C has true floating-point variables, unlike BDSC, it has a proper library which is lacking in the Software Toolworks version, and it is much less cumbersome (and less expensive) as well as more standard than Whitesmiths which, though generally agreed to be the most complete implementation, is also very 'mainframe' in feel, with lots of cryptic error-messages.

Features

Aztec-C is a complete new system which in general won't handle programs developed under another. Forget Basic . . . this is C. File compatibility is maintained, however, and in some ways enhanced, since a Unix convention is applied. This says that there's no real meaning in the concept of a file-type, with the result that it is quite possible to load an executable binary image into the text-editor. Admittedly, this is a pretty silly thing to do, but Unix

(and most of its derivations) figure that you're the Boss, and if you want to do silly things, then it's your business.

The same flexibility of approach is found in the language, which like all Cs allows almost anything to be done at any point in a program, with the merit of that detail being left to the programmer.

Aztec-C is a particularly accurate implementation of C with almost all features of the 1978 definition. The only difference is the lack of bit-fields, which are a bit of a luxury anyway. There is one small deviation from the standard in the library, caused by the fact that Unix uses the line-feed character (\$OA, Control-J) as an end-of-line terminator. Apple DOS, on the other hand, uses carriage-return (\$OD, Control-M). So in the DOS version two versions of getc() and putc() are provided, one which translates and one which doesn't.

Linking the non-translating versions produces code which will run under Unix, the others give code which runs under DOS. It's not a perfect answer to the problem but it's reasonably convenient. Producing object-code for a non-DOS system doesn't require a whole new compilation — all you have to do is to relink, using the alternative routines.

It has often been said of one 'real' language or another that it can't be implemented because the various component programs won't fit on a micro. The Aztec-C system-programs not only fit, but

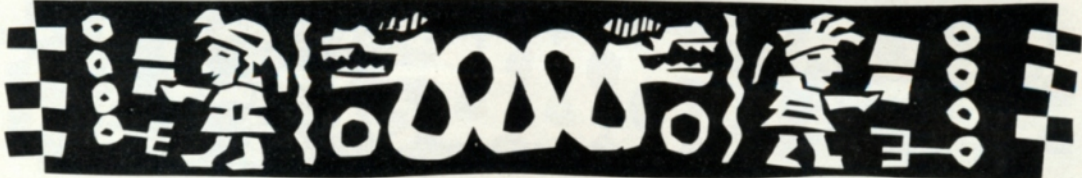
do so quite comfortably. Admittedly, with the small (143K) capacity of the Apple disks, an evolved working setup generally results in three types of system-disk having one major section of the system on each. Using the full system involves a certain amount of disk-swapping, but I didn't find this irritating because the very sophisticated batch-control features of the shell eliminate much of the drudgery that this entails.

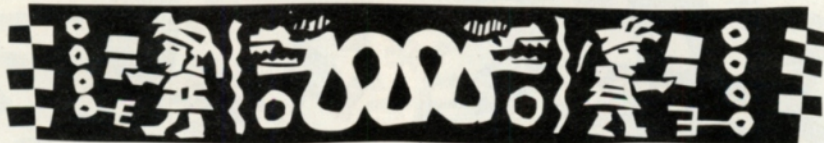
Another 'truth' is that it is almost impossible to write a compiler for the 6502. Oh? What's this here program called C65, then? Putting C source through it produces code full of stuff like LDA\$00, TAX, PLA, ASL, TAY, LDA \$30,X, DEY and so on, which the 6502 assembler swallows without a murmur.

The Aztec-C system is available in three major versions — for the 6502, Z-80 and 8086 — and each can be delivered for several machines. (see list.) Each is compatible with another at the source-code level, and provided one is running on the pseudo-machine they should be compatible in compiled (but not linked) form. Whether native code on the same processor in different machines is compatible is something that couldn't be checked.

Under Apple DOS 3.3 the complete system is in effect a 'proto-Unix'. It looks very much like Unix, and in many ways operates much the same, too. It isn't UNIX, however, because there aren't (as yet) any tree-structured directories, pipes

MARK GODDARD





◀ 53 or genuine filters. Neither is there any multi-tasking, which would be a pretty silly thing to make most micros do anyway. It can be done, but the result isn't going to be much more than a toy. You certainly won't be able to run six or seven real programs because there just won't be enough room, nor sufficient throughput from the CPU.

The system does follow the Unix convention of keeping the actual command-processor as a normal program instead of as part of the system-tracks, so re-modelling this could add any facilities which are thought desirable. However, don't blame me if the flexibility of the system results in you planning subtle programs of deep complexity which simply won't fit.

Documentation

The documentation is large, comprehensive, and fairly hard to understand. In fact, to make much sense of it at all you will definitely need a copy of K & R, and will have to do quite a lot of work with the archive and library files.

The problem is that the information is all there, but much of it locked up in these files. In particular, it seems that the only way of obtaining a comprehensive memory-map is to use the 'arch' program to extract each module, then to re-assemble and relink the entire system again with the 'list' option turned on in assemblers and the linker. This results in symbol tables being put on the disk, and sorting these lists in various ways reveals the secrets.

The documentation also assumes that you have a fair knowledge of macro-assemblers, link-editors and so on. Each is explained, but not verbosely, and none of the manuals pretends to be a tutorial — they are definitely reference works.

Operation

The system formed by the Aztec-C shell and associated utilities, though more 'mainframe' in feel than many other micro operating systems, is quite easy to learn by messing about — not so big that it is hard to remember, nor so small that it's cramping. A pleasant balance of features is the key to its ease of use.

In DOS it actually consists of the shell, the profile, an editor and two complete sets of programmers' tools and files each comprising a compiler, assembler and library files, the output from which are combined into a runnable program by the

linker. There are also a number of utilities for examining files of various types, but to form a really developed system you'll have to add some more of your own, or filch the source from someone who's done it already.

The .profile is an idea nicked directly from Unix. Actually, it's a perfectly normal exec-file which makes things happen when it's called. Typical tasks might be to load special drivers or to run a menu-program. The significant aspect of the .profile is the name, which the shell searches for on booting. If it's there it is executed.

The standard editor, VED, is a bit thin and not very fast either. It's adequate for editing command-files and programs, but I'm not writing this review on it, for example.

The worst omission is the lack of search-and-replace which can result in some tiresome retyping. It does have some nice features such as a Help page which is displayed in response to a question mark being typed. I liked the security of it, too. If a file is loaded for editing and some changes are made and a :q (quit) command is entered, the editor tells you that the file has been altered, and it won't exit unless an exclamation-mark is appended to the command as a confirmation. A similar check is made for 'new file' and others.

The process of writing and running a program in C is much the same as for any other compiled language. First you write some source code and save it as a normal text-file. Next the desired compiler is invoked, either CCI or C65, depending on what output is wanted. CCI will produce assembly language for a pseudo-machine, C65 will produce 6502 assembly code. Naturally, the other versions have compilers and assemblers for their own processors.

Apart from the 6502, the Z-80 and 8086 are currently supported, and cross-assemblers are available so that the system is not genuinely portable but even more so than certain other much-vaunted operating systems.

Assembler output is combined with modules from the library by the linker. This produces an executable program which can be run (under the Aztec-C shell) simply by typing its name, together with any arguments. Routines in the shell are used as a library to save on space, and though in general this would mean that

programs are just as dependent on being supported by the rest of the system as p-code is in the p-System (a crippling limitation). Aztec-C has an extra set of libraries which stand alone — they work without the rest of the system being present. Invoking the linker with these files as the libraries will produce a program which is, to all intents and purposes, a perfectly normal self-contained machine-code program.

Plenty of source-code is included in the library, including all the drivers, all of the standard C functions as defined in K & R, not to mention the whole of the pseudo-interpreter which is highly unusual in itself.

The linker is a fairly comprehensive one with all the essential facilities. Symbol-tables may be produced, the base-, code- and data-addresses may be independently specified and the list of libraries can be read from a file. The linker uses the standard Apple-DOS R-format files, which are described in the DOS manual. The CP/M version uses the .REL format, which is much the same thing.

The pseudo-machine alluded to earlier is a fairly typical one, with dozens of opcodes, many of which are much more sophisticated than any real processor. Included are multiply and divide operations, modulo, 2s-complement, unsigned and floating-point arithmetic as well as eight different comparisons.

Verdict

The system, as it stands, is as good as others of its type, and better than most. Certainly it's less dictatorial than the p-System, more flexible than CP/M and its languages, and less idiosyncratic than BCPL on the BBC. Apart from other Cs, this is probably the product which Aztec-C resembles most closely. I like it enough to consider it a serious alternative for major products, and would recommend it.

PCN

RATING

Features



Useability



Documentation



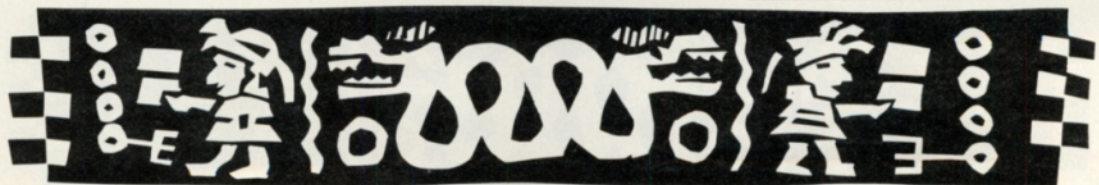
Performance



Value



Name Aztec-C **Application** C compiler for program development **System** Apple, CP/M 80/86, MS-DOS, PC-DOS, Commodore 64 **Price** £160 (8 bit), £195 (16 bit) **Supplier** Tamsys Ltd, Pilgrim House, 2-6 William Street, Windsor, Berks 95-56747.





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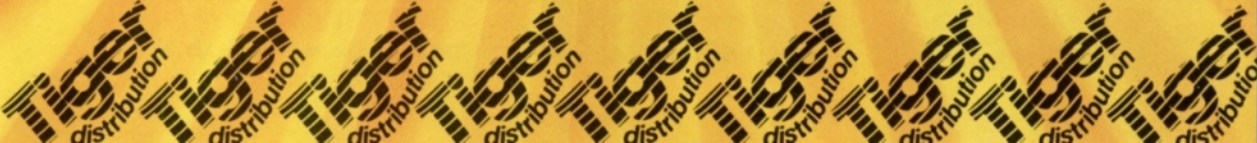
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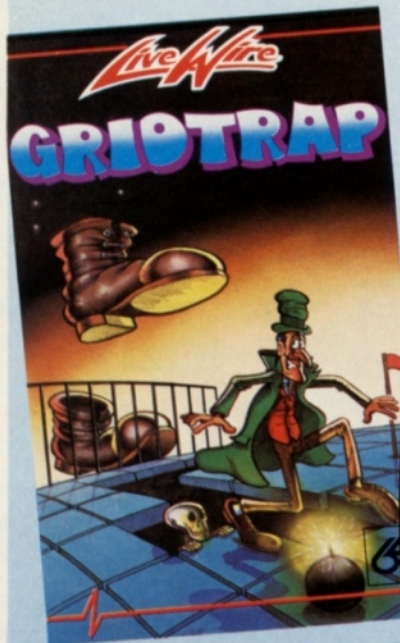
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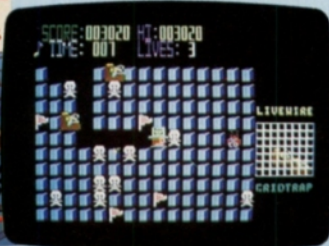


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SPECTRUM

Bovryll bover

Name Bedlam **System** Any Spectrum **Price** £5.95 **Publisher** MC Lothlorien, 56a, Park Lane, Poynton, Cheshire. **Format** Cassette **Language** Machine code **Outlets** Mail order/Retail

Call me narrow-minded, but until recently I thought it was possible to judge the quality of a program simply by its size — ie if it fits in 16K then forget it. I was wrong.

Objectives

You're trapped on an Asylum planet called Bovryll. To escape you must move around the planet, or to be more accurate, a maze of cubes as this is what Bovryll looks like on your TV screen, killing things before they kill you.

In play

There are three skill levels to choose from, Level 1 is 'easy' and allows you to race around the maze incredibly quickly, Level 3 is 'hard' and simply slows your movement down, making you an easier target.

A nice feature of this game is that it allows you to redefine the playing keys. This, of course, means that Bedlam is compatible with absolutely any joystick — what a super idea.

Unfortunately, whether you choose to use joystick or keyboard, the control of your laser takes some getting used to. This is because to change direction and run, something that I needed to do quite often,

you need to push the joystick once to point you in the required direction, then release it and push again to actually move. This system is sometimes useful but more often just plain troublesome, and totally baffling if you haven't read the instructions before playing.

Most of the things that you have to kill are simply kamikaze nutters who hurl themselves at you. However, as you progress through the game flying saucers appear and these actually shoot at you, and quite accurately too. Both types of enemy move within the confines of the maze, the maze being only one screen in size. It is therefore easy enough to develop some sort of battle tactic.

Verdict

Though the game plan is not original, it is still enjoyable.





The use of sound and graphics is superb, with good animation of the various lunatics. In fact, some of my friends didn't want to shoot them as they were so cute.

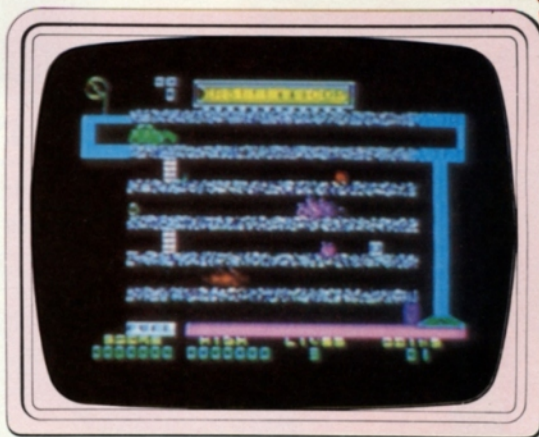
It's a pity that the game doesn't progress anywhere; with no different screens to work up to and explore, you're left trying to beat the previous high score. Even so, because of the difficulty involved and the excellent use of graphics, it still ends up being fun to play.

Top marks too for the redefinable keys, and all this in 16K.

Roger Howorth

RATING

Lasting appeal 
Playability 
Use of machine 
Overall value 



Morris askance

Name Morris Meets the Bikers **System** Any Spectrum **Price** £6 **Publisher** Automata UK Ltd, 27 Highland Road, Portsmouth, Hants PO4 9DA **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Mail order

We're suffering from a case of Morris Invaders — after Maurice Minor for the Dragon 32 comes this arcade-type game in which the family favourite does battle with the leather-jacketed bikers.

Objectives

You're in a six-storey car park and must exit at bottom right, avoiding hazards and collecting enough coins to pay your parking fees. There are nine screens to get through before you reach freedom.

In play

Morris begins at the top left of the screen, and down either side are travel lifts, which he uses to get from one floor to another. You choose which keys you want to use for moving Morris and firing or, in this case, parping.

Before you can exit to the next screen you must collect ten coins which appear randomly one at a time on the various levels. You have to collect each coin, and if you try to exit without all ten coins you lose one of your five lives. You have to keep an eye on the fuel gauge, of course, and collect the cans of fuel which appear.

Having worked out what to collect you must then work out what to avoid. Only by playing the game do you discover that

the flashing horseshoe shapes are wheelclamps which hold you still for a few seconds, while the double-prongs are tin tacks which slow down your speed.

The two lifts start at slightly different levels but can be lined up simply by riding one of them to the top. Brick walls block off some levels on each screen, and there are 'P' for parking signs which remove some of your collected coinage when you drive over them. There's no way of avoiding the hazards completely as coins frequently appear between a hazard and a wall.

And finally there are the bikers. These ride from side to side on all levels save the bottom one where you have a free run to the exit. They move at the same speed as Morris (unless he's been tin-tacked) and can be blasted out of existence with a beep from his horn. You can be almost at the safety of the lift when a biker appears from nowhere and you're a gonner. You can't continually sound your horn as you don't move while it's beeping.





Verdict

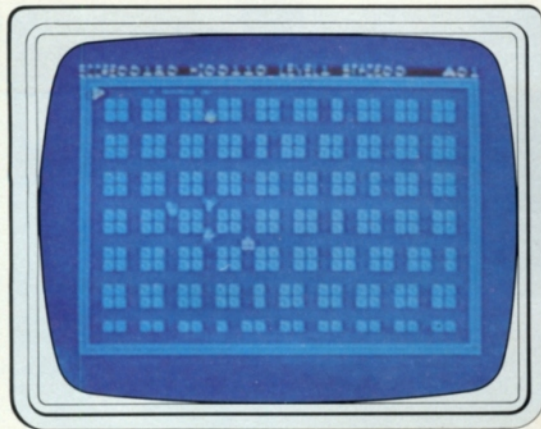
After the pottiness of *Pimania* and the glories of *Groucho I* was disappointed to see Automata putting out a run-of-the-mill arcade game. After just a few plays I'd progressed to the fifth of the nine screens, so ace games players should polish this off in no time.

It's a silly-game in the wrong sense of the word.

Mike Gerrard

RATING

Lasting appeal 
Playability 
Use of machine 
Overall value 



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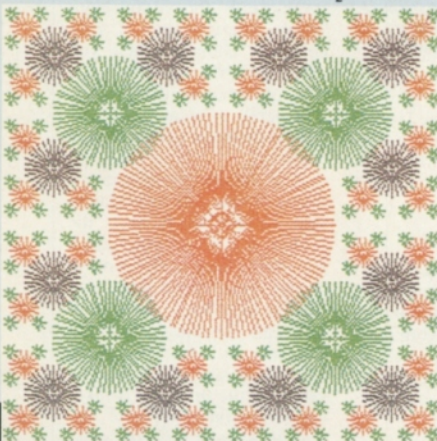
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64 selection

New games for the 64 are beginning to pour onto the market. Here's a sample of the latest.

HEROES OF KARN

INVALID
MOVE!
SOUTH--
CMD

Heroes of Karn is a large text adventure with the bonus of a graphic depiction of each location. There are also pleasant musical entertainments when you reach certain points — one of the airs, *Greensleeves*, is rendered as soon as you begin the adventure.

The cassette inlay gives some imaginatively written background to the story, from which you learn that you must rescue the four Heroes of Karn, each of whom has his own special abilities which you will need to call upon. Needless to say, you must also find and bring back the treasures of the realm. Meet up with a gypsy encampment and you'll discover a bit more.

The graphics are interesting and drawn quite quickly although colour in-fill is rather slow. However, each picture is only drawn on your first visit to a location so you needn't wait again unless you request a fresh look.

Commands can be complex, ranging from the simple — take box, north, etc — to the more sophisticated. Some of the commands and formats are provided on the cassette inlay.

There is a save game facility but this is available only when you quit or restart the game.

An interesting and lengthy adventure that is likely to keep you away from your other games while you try to finish it.



WIDOW'S REVENGE



The widow in question here is a spider, a black widow. What the game turns out to be is another variation on an old theme — centipede.

An army of beetle-like insects tramps across the screen firing rays down the screen whenever they collide with one of the many eggs clattering up the place. Below, you control a cannon, the idea being to obliterate all objects indiscriminately, animate or inanimate.

The widow in question has only a small role — to scurry across the screen at random intervals, hoping you blunder into its path. A flapping vulture is on hand to replace the eggs you are busy blasting.

There are many rousing sound effects and bags of action to keep you from nodding off. The trouble is that it is too similar to (but not quite as good as) *Exterminator*, *Bubble Bus*'s earlier *Centipede* look-alike.



KICK OFF



Far better is *Bubble Bus*'s other new release, *Kick Off*. This is a micro version of that old seaside and arcade mechanical favourite — *Table Soccer*.

Kick Off is Pretty similar except the rows are controlled by joystick or keyboard. The

computer records the scores and keeps putting up the balls. Though it is mainly intended as a two player game, you can play by yourself. However, the one player contest is pretty dull as the computer doesn't take over the other side. At the start of every match, you are treated to a rendition of a sporty tune and you can select the ball speed. Control of your rows of players takes a little getting used to but, once you've got the hang of it, it becomes second nature. You get eight balls per game and the teams change ends once four of them have been used.

Great fun. Addicts of the original will find this comes well up to expectations.



XERONS



In more familiar arcade territory is *Xerons*, a game that Galaxian fans especially will welcome. Against a backdrop of twinkling, coloured stars, you move your ground-based ship left and right to battle against bomb-dropping, suicidal aliens.

The *Xerons* are a mixed bunch, some wiggling, some spinning like demented starfish. Several of them peel off and swoop down towards you, releasing bombs as they dive and loop. Overcome one wave and another soon follows, meander and swifter.

There are no skill levels or starting screens and you can have only one missile in the air. These restrictions apart, this traditional space shoot-up, aided by attractive graphics and decent sound effects, is thoroughly enjoyable.



LODE RUNNER



This *Commando* sets you up as a galactic commando

whose job is to recover as many stolen treasure chests as you can. The setting is a multi-floored chamber whose platforms are linked by ladders and tightropes. Pursuing you are a number of two-legged enemies — you can leap, swing across the tightropes, climb up and down ladders, and dig traps in order to escape.

The catch? There are 150 different screens to conquer. If that's not enough, there is a built-in game generator for you to create another 150 screens of your own design. Given this facility, you could end up playing *Lode Runner* for ever.

An exciting game of grab it and go — though expensive, its scope gives excellent value.



Heroes of Karn (cassette £7.00)

Interceptor Micros, Lindon House, The Green, Tadley, Hants.

Widow's Revenge, Kick Off (cassette £5.99) *Bubble Bus*, The Computer Room, 87 High St., Tonbridge TN1 1LS.

Xerons (cassette £5.95) Supersoft, Winchester House, Canning Road, Wealdstone, Harrow HA3 7SJ.

Lode Runner (disk £24.95) Broderbund, USA — available from Centresoft stockists.

VIC-20

Zeal for Zorgon

Name Zorgon's Kingdom **System** Expanded (8/16K) **Vic 20 Price** £6.99 **Publisher** Romik Software, 272 Argyll Avenue, Slough, Berkshire **Format** Cassette **Language** Machine Code **Other versions** None **Outlet** Mail order and most dealers.

Zorgon's Kingdom is described by Romik as a 'real-time graphical adventure' and, while that may be stretching things a little bit, this is nonetheless an original and absorbing game.

Objectives

For reasons best known to Romik, you find yourself in an interesting and unusual kingdom populated with a strange mixture of aliens and alien devices. You have to manoeuvre yourself around the five screens by using a variety of keys (since the joystick option didn't work on my Vic 20) in order to defeat the evil Zorgon minions and, who knows, maybe even the master Zorgon himself.

En route you have to pass through a weird assortment of obstacles that put your reflexes to the test, and lead to an acute case of 'arcade finger'.

Your progress is timed throughout the game, and the ultimate objective is to defeat Mr Zorgon in the shortest time possible.

In play

The first stage of the game takes a while to load, and the Play key

on the tape deck must be left down for subsequent stages.

Although it gives you a little breathing space in between levels, it can become a major one when, having lost all your lives, you find that you have to start from level one again and re-load everything.

Level one is a pretty mundane affair; you have to run up ladders and avoid holes and various bombs. You have to do the whole thing again when you've reached the top for the first time.

On to level two, where the pace hots up a bit. Here you begin by jumping onto moving lifts, then you have to avoid a swarm of falling aliens that look like bats but are referred to as 'Gorgoids' (shades of Kenny Everett), swing along onto a boat and off it again, chase a few octopi and catch them when they mutate, and finally escape.

Level three is even more ridiculous. Among other things you have to avoid organ pipes and electric wires in your attempts to progress further.

Here your reviewer's progress ground to a halt.

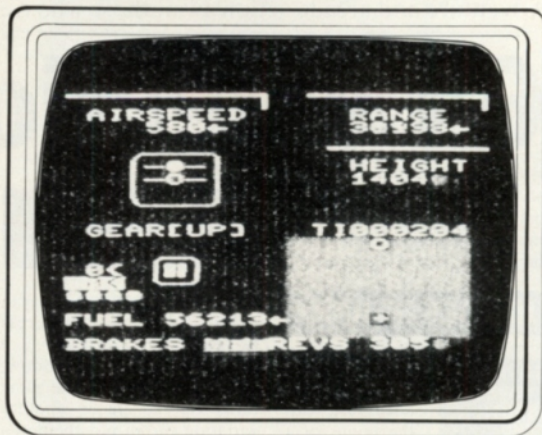
Verdict

If you have the required memory expansion this is well worth investigating. A shame about the lack of a joystick on my version, but the game certainly manages to pack a lot into a little computer.

Pete Gerrard

RATING

Lasting Appeal 🐾🐾🐾🐾
Playability 🐾🐾🐾🐾
Use of Machine 🐾🐾🐾🐾
Value for Money 🐾🐾🐾🐾



Flying buttress

Name Flight Zero-One-Five **System** Unexpanded **Vic 20 Price** £6.95 **Publisher** A.V.S. **Format** Cassette **Language** Basic **Other Versions** None **Outlet** Mail order Retail.

Looking nothing like the Rolling Stones record of almost the same name, Flight Zero-One-Five is an above-average flight simulator for the unexpanded Vic 20.

Objectives

As you may well guess, your aim is to control a plane from take-off to landing again, watching out for air turbulence in between.

The extremely helpful instruction sheet supplied with the cassette gives detailed advice on how to control everything, so without further ado it's over to the Sopwith Camel, on with the flying helmet and chocks away.

In play

The one and only screen display that you get throughout the game has a maze of information on it, but after a few experimental flights you eventually get to know what everything is doing. Among the many things to look at and get yourself confused by while playing the game are the airspeed, range, artificial horizon, course indicator, radar screen, fuel level, revolution counter, and much more.

The display itself, despite having all this to look at, is quite clear, and unlike many Vic programs someone appears to

have thought about the colours that will be used to show vital information on the screen.

The control keys are many and varied, and you'll have to constantly refer to the instruction sheet provided in order to remember them all. Eleven keys are used in total, including the four function keys, and although one could argue with the choice of some of them they're all easy enough to remember in times of panic. It's not meant to be easy.

The use of graphics is pretty perfunctory as most of the information shown on the screen is purely textual. The sound is rather better, and the sound of the aircraft racing along the runway prior to takeoff has been done well.

Overall it is not too difficult to master once you can remember where all the control keys are. Indeed, the instruction sheet guides you through your first flight, so it becomes merely a question of doing everything at the right time. You are told what went wrong if disaster does occur, as it inevitably will at first, but you shouldn't have any major problems in landing safely after the first five or six attempts.

Verdict

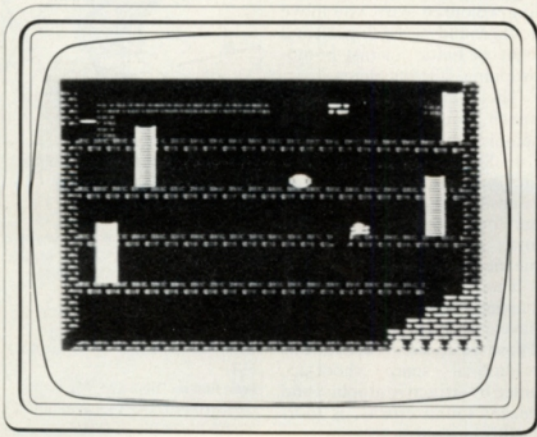
Clearly a lot of thought has gone into this, and it manages to pack an awful lot into the limiting 3.5K of the unexpanded Vic.

If flight simulators your thing, then simulate yourself a few quid and buy a copy.

Pete Gerrard

RATING

Lasting Appeal 🐾🐾🐾🐾
Playability 🐾🐾🐾🐾
Use of Machine 🐾🐾🐾🐾
Value for Money 🐾🐾🐾🐾



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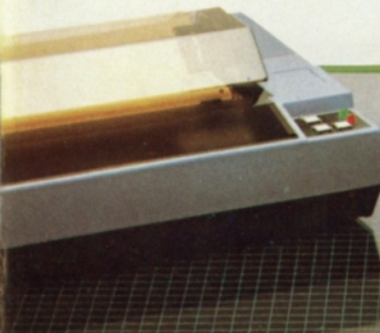
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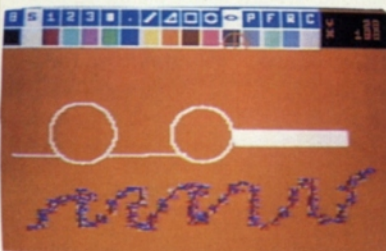
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Gridtrap, from M S Fowkes of Bearpark Durham, is a game of skill, thought and speed. The idea is to escape from the blue grid by collecting all the green diamonds. Those of you using grey and grey televisions will of course see a grey grid with lighter grey diamonds, but a little imagination works wonders.

You, represented by the pink line, start from the yellow square (light grey) and, moving along the grid lines, make your way to the nearest diamond. Avoid the red obstacles as these tend to be a little bit lethal when you run into them (you wind up out of the game). Also don't try to run over your own trail as

this will take you out of the game as well. Your moves will be timed, and if you take too long planning your next target diamond, points will be subtracted from your score. Since you cannot go to the next grid with a negative score make your moves as fast as you can.

PROGRAM NOTES

Title : *Gridtrap*
Machine : *Lynx 48K*
Application : *Game*
Language : *Lynx Basic*
Author : *MS Fowkes*

20 Initialise variables: S = score, G = grid no., J = time limit to move.
30 User-defined graphics.
40-90 Game.
100 PROC GRID draws blue grid and then protects it.
230 PROC INIT draws the grid border and the titles.
360 PROC SETUP.
370-410 Draws the red obstacles.
440 Initialises the starting point.
460-570 Draws the green diamonds.
500 Checks that there are no diamonds already in that position.
520 Checks that there are no obstacles in that position.
590 PROC GAME.
630 Nequals the number of diamonds collected.
680-710 Keyboard input (cursor keys).

```
0 REM **GRIDTRAP M.S.FOWKES 1984**
10 PROTECT 0
20 LET S=0,G=1,J=300
30 PROC GRAPHICS
40 PROC INSTRUCTIONS
50 PROC GRID
60 PROC INIT
70 PROC SETUP
80 PROC GAME
90 END
100 DEFPROC GRID
110 CLS
120 INK BLUE
130 FOR A=10 TO 190 STEP 10
140 MOVE 0,A
150 PLOT 3,250,0
160 NEXT A
170 FOR A=10 TO 240 STEP 10
180 MOVE A,0
190 PLOT 3,0,200
200 NEXT A
210 PROTECT BLUE
220 ENDPROC
230 DEFPROC INIT
240 INK RED
250 MOVE 0,0
260 PLOT 3,250,0
270 PLOT 3,0,200
280 PLOT 3,-250,0
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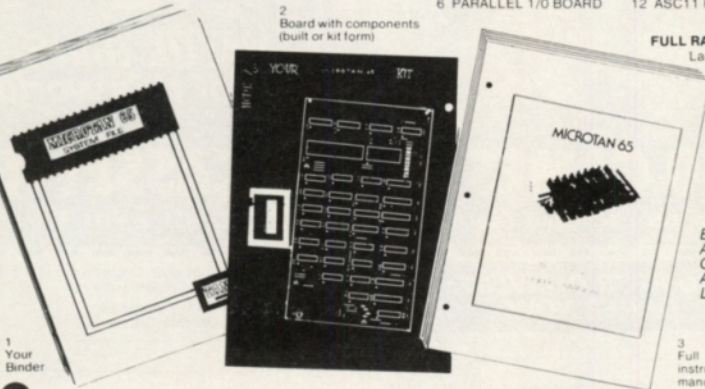
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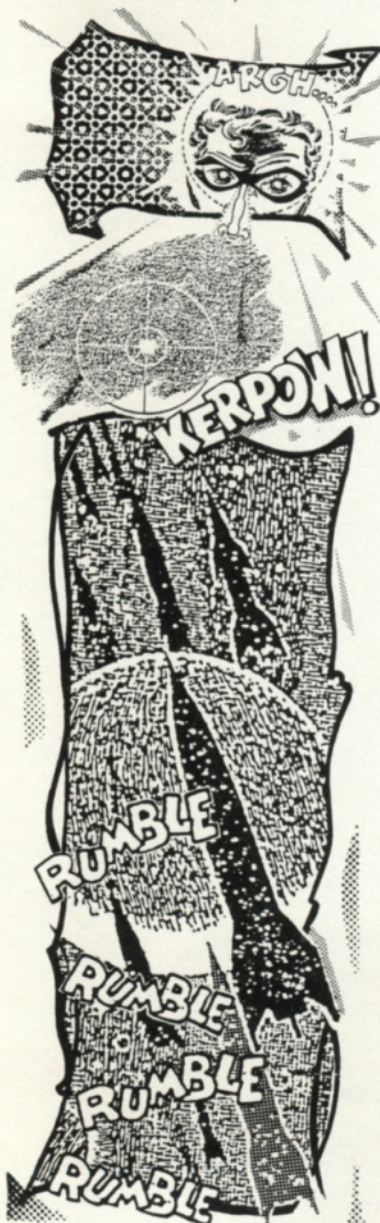
GRID TRAP

730-750 Routine used if you take too long over your go.
 760-763 Move the track.
 780 Does the track collide with a diamond?
 805 If yes then bonus points.
 810 If no, then does the track collide with an obstacle.
 830 If yes then end game.
 860 If the number of diamonds collected equals the number

```

290 PLOT 3,0,-200
300 PRINT @ 50,103;CHR$(24);"GRIDTRAP";
CHR$(25);
310 INK GREEN
320 PRINT @ 9,213;"GRID";, @ 97,213;"SCORE";
330 INK YELLOW
340 PRINT @ 12,225;G;" ";, @ 98,225;
S;" ";
350 ENDPROC
360 DEFPROC SETUP
370 FOR A=1 TO 20+G*4
380 LET I=10*(RAND(15)+2),C=10*(RAND(20)+2)
390 PRINT @ C/2-1,1-5;CHR$(1);CHR$(2);CHR$(129);
400 BEEP 70,80,60
410 NEXT A
420 LET C=10*(RAND(23)+1),L=10*(RAND(18)+1)
430 PRINT @ C/2-1,L-5;CHR$(1);CHR$(6);CHR$(130);
440 MOVE C,L
450 INK 4
460 FOR A=1 TO 20+G*4
470 LET C=10*(RAND(24)+1),I=10*(RAND(19)+1)
480 LET A=I*32+C DIV 8
490 LET B=2**(7-C MOD 8)
500 CALL &0070,&C000+A
510 LET D=SGN(HL BNAND B)
520 CALL &0069,&C000+A
530 LET D=D+SGN(HL BNAND B)
540 IF D>0 THEN GOTO 470
550 PRINT @ C/2-1,1-5;CHR$(128);
560 BEEP 100,90,60
570 NEXT A
580 ENDPROC
590 DEFPROC GAME
600 FOR A=100 TO 200 STEP 10
610 BEEP A,50,60
620 NEXT A
630 LET N=0
640 INK RED
650 PRINT @ 97,225;CHR$(1);CHR$(6);S;" ";CHR$(1);CHR$(2);
660 BEEP 110,120,45
670 LET T=1
680 REPEAT
690 LET T=T+1
705 LET M=INP(&0080),O=INP(&0980)
710 UNTIL T>J OR ((M=239 OR M=223) OR (O=251 OR O=223)) AND (NOT(M<>255 AND O<>255)))
720 IF T<J THEN GOTO 760
730 BEEP 120,90,50

```



GRID TRAP

890 of diamonds on the grid and
 the score is greater than
 zero then do the next grid.
 PROC GRAPHICS, define
 characters 128 to 130.
 930 PROC GRIDCLEAR.
 980-1020 Scroll the screen
 horizontally.
 1030-1040 Return the screen to normal.
 1050 Increase the grid number.
 1060 Decrease the
 movement time limit.

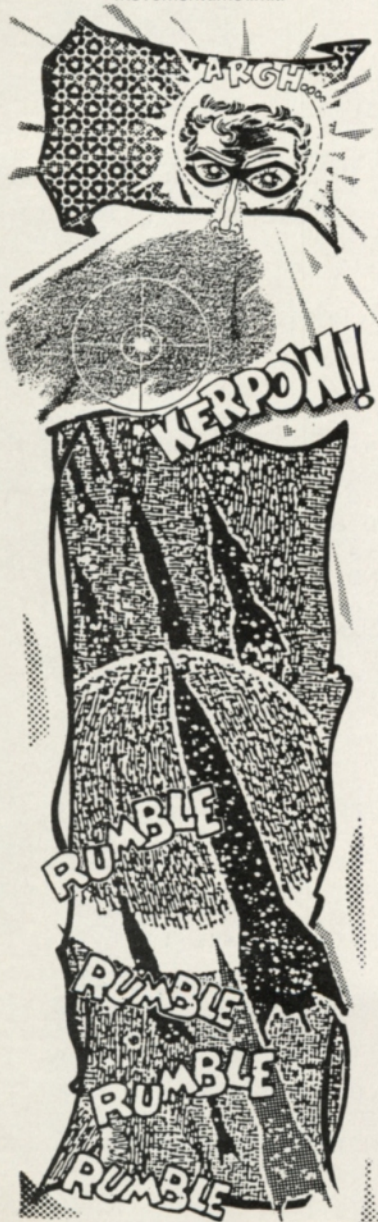
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740 LET S=S-20*G
750 GOTO 650
760 IF M=239 THEN LET L=L-10
761 ELSE IF M=223 THEN LET L=L+10
762 IF O=251 THEN LET C=C-10
763 ELSE IF O=223 THEN LET C=C+10
770 LET Q=2**(7-C MOD 8)

780 CALL &0070,&C000+L*32+C DIV 8
790 LET Z=SGN(HL BNAND Q)
800 IF Z=0 THEN GOTO 810
805 LET S=S+10,N=N+1
807 GOTO 840
810 CALL &0069,&C000+L*32+C DIV 8
820 LET Y=SGN(HL BNAND Q)
830 IF Y=1 THEN PROC ENDGAMEF
840 LET S=S+1

850 DRAW C,L
860 IF N=20+G*4 AND S>0 THEN PROC GRIDC
LEAR
870 GOTO 650
880 ENDPROC
890 DEFPROC GRAPHICS
900 CODE 00 00 0C 1E 3F 3F 1E 0C 00 00
00 00 3F 0C 3F 0C 3F 00 00 00 FF FF F
F FF FF FF FF FF 00
910 DPOKE GRAPHIC,LCTN(900)
920 ENDPROC
930 DEFPROC GRIDCLEAR
940 DRAW C,L
950 FOR W=400 TO 180 STEP -15
960 BEEP W,40,60
970 NEXT W
980 FOR F=0 TO 31
990 OUT &0086,13
1000 OUT &0087,F
1010 BEEP 100-F,100,60
1020 NEXT F
1030 OUT &0086,13
1040 OUT &0087,0
1050 LET G=G+1
1060 IF J>100 THEN LET J=J-50
1070 CLS
1080 PROC INIT
1090 PROC SETUP
1100 PROC GAME
1110 ENDPROC
1120 DEFPROC ENDGAMEF
1130 FOR K=0 TO 20
1140 LET Y=RAND(30)+1
1150 OUT &0086,13
1160 OUT &0087,Y
1170 BEEP 120-Y,120,60
1180 NEXT K
1190 OUT &0086,13
1200 OUT &0087,0
1220 PRINT @ 50,35;CHR$(24);CHR$(1);CHR

```





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GRID TRAP

PCN PROGRAMS: LYNX 48K

1080 Replay the game.
 1120 PROCENDGAMEF.
 1130 Randomly displace the
 screen horizontally.
 1190-1200 Reset the screen.
 1220-1260 End messages.
 1290 Play again?
 1310 Reinitialise the variables.
 1330 Replay.
 1350-1480 PROCINSTRUCTIONS
 display the instructions
 screen.

```

$(6); "GRIDTRAP";
1230 PRINT @ 45,45;CHR$(1);CHR$(2);CHR$(
(2);CHR$(0);" GAME OVER ";CHR$(25);
1240 PRINT @ 30,207;CHR$(1);CHR$(6);"YO
U CLEARED ";G-1;" GRID";CHR$(83*NOT(G-1=
1));
1250 PRINT @ 24,217;"AND SCORED ";S;" P
OINTS";
1260 PRINT @ 18,238;"Y' TO PLAY AGAIN
- 'N' TO END";
1270 LET I$=GET$
1280 IF I$="Y" OR I$="y" THEN GOTO 1310
1290 IF NOT(I$="N" OR I$="n") THEN GOTO
1270
1300 END
1310 LET S=0,G=1,J=300
1320 CLS
1330 GOTO 60
1340 ENDPROC
1350 DEFPROC INSTRUCTIONS
1360 PAPER 0
1370 CLS
1380 PRINT @ 50,0;CHR$(1);CHR$(2);CHR$(
(24);"GRIDTRAP";CHR$(25);
1390 PRINT @ 44,26;CHR$(1);CHR$(6);"INS
TRUCTIONS";CHR$(1);CHR$(4);CHR$(10)
1400 PRINT ;CHR$(1);CHR$(4);"Your base,
represented by the yellow square, is
situated on the first of the ";CHR$(1);C
HR$(2);"GRIDTRAPS";CHR$(1);CHR$(4);". T
o escape from the grid you have to move
around the grid collecting the ";
1410 PRINT "green diamonds (";CHR$(1);CH
R$(4);CHR$(128);") whilst avoiding the
";
1420 PRINT "red obstacles (";CHR$(1);CHR
$(2);CHR$(129);CHR$(1);CHR$(4);)". If yo
u cross your own trail or hit on obstacl
e you will never escape from the ";CHR$(
1);CHR$(2);"GRIDTRAP";CHR$(1);CHR$(5)
1430 PRINT CHR$(1);CHR$(5);" You move
using the cursor keys. When all the diam
onds on a particular grid have been co
llected you progress to the next one. Ea
ch successive grid has more diamonds to
collect and also ";
1440 PRINT "more obstacles."
1450 PRINT CHR$(1);CHR$(2);"BE WARNED!!
You have a limited time in which to mov
e! if you fail to move in the allotted
time you lose points. Also, you cannot m
ove onto the next grid with a negative s
core."
1460 PRINT @ 26,241;CHR$(1);CHR$(7);"PR
ESS ANY KEY TO START";
1470 LET I$=GET$
1480 ENDPROC
    
```



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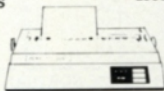


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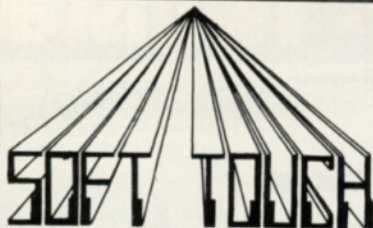
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			I-EEE	Centronics	20ma	RS232	Others ●																		Others (+)	Fan Fold	Roll	Car Sheet	Tractor	Frictional	Distributor		
Star DP-515	£460	M9×9	●	+	+			9600	2,300	6.8	10,12,17	100	233	15	515×542×136	10	3	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	M7
Systime System	£1,909	M			●			9600	256	6.8	10	120	132	16	71.7×61	53	6																S4
Systime Sysprint-S	£1,599	M			●			9600	256	6.8	10	120	132	16	71.7×61	53	6																S4
Tandy TRS 80 DW2	£1,299	Daisywheel	●					9600	2000	6	10,12	43	163	16.5	62.4×20.4	27	4	●	●	●	●												T1
Texas Instruments 745	£1,470	Thermal			●			300	256	6	10,17	30	80	8.5	39.1×40.6	13.5	1																R1
Texas Instruments 781	£1,259	Thermal 7×5			●	●		9600	256	6	10,17	120	80	8.5	40.6×15.24	8.5	1																D5
Texas Instruments 810	£1,369	M9×7	+	+				9600	256	6.8	5.8,10,16.5	150	132	15.5	65.4×50.8	25	9																D5
TRD 170S	£834	Daisywheel	○	○	○			19200	256	6	10,12,15	17	132	15.5	64×45.7	40	5																D5
Toshiba T1350	£1,495	M	○		○			9600	256	6	10,12	192	192	15	55×38	19.9	3	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	T4
Walters WM2000	£477	M9×9	+	●	+			19200	750	6.8,12	5.6,6.8,3,10,13.3,16.6	128	132	10	43.9×33.5	12	4																W1
Walters WM4000	£713	M9×9	+	●	+			19200	1500	6.8,12	5.6,6.8,3,10,13.3,16.6	150	220	15	63×39	13	5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	W1
ZX Printer	£40	Electrical					1	N/A	N/A	9				4	14×4.6	N/A	1															S5	

PRINTERS

MONITORS

These have been split into **colour** and **monochrome**.

Screen size is a diagonal measurement in inches. Nearly all monochrome monitors accept a **composite video** signal from the computer and most computers are equipped with composite video output. Colour monitors feature a wider range of **signal** systems than mono and it is important to match the output of your computer to the input of the monitor.

An **audio channel** will enable sound to be output from a speaker inside the monitor. **Mono tint** refers to the colour of the text on an mono monitor. Some monitors come with an **anti-glare filter** to relieve operator discomfort.

Band width refers to the frequency range of signals to which the monitor can respond in MegaHertz. **Dot resolution** indicates the number of dots which can be displayed across the screen; the more dots, the sharper the picture.

Dimensions indicates the area the unit occupies on the desktop.

Make & Model	Price inc VAT	Screen size (in inches)	Signal					Band width (in MHz)	Anti-glare filter	Dot resolution	Dimensions (cms)	Weight (kilos)	Distributor
			Modulated PAL	Unmodulated PAL	TTL RGB	75 Ohm linear	32 bit 4 bit TTL						
Crofton C1401	£300	14	●						10	600	37×42	10	C4
HM 2713	£3,120	13							25	720	54×40	36	B1
HM 2719B	£2,553	19	●						25	960	50×49	46	B1
HM 2719C	£3,042	19	●						25	960	50×49	46	B1
HM 3619	£3,548	19	●						45	1280	50×44	48	B1
Kaga Vision II	£327.75	12	●				●		15	510	32×30.3	12.5	D6
Lion Cub 1431-TTL	£286	14	●						7	585	65×57.5	11.5	S6
Lion Cub 1436	£316	14			●				7	585	65×57.5	11.5	S6
Lion Cub 1445	£633	14			●	●			15	895	65×57.5	11.5	S6
Lion Cub 1449	£604	14			●				15	895	65×57.5	11.5	S6
Lion Cub 1451-TTL	£430	14	●						10	653	65×57.5	11.5	S6
Lion Cub 1455	£483	14			●	●			10	653	65×57.5	11.5	S6
Lion Cub 1459	£459	14			●				10	653	65×57.5	11.5	S6
Lion Cub 2031-TTL	£344	20	●						7	585	65×57.5	11.5	S6
Lion Cub 2051-TTL	£646	20	●						10	940	65×57.5	11.5	S6

COLOUR MONITORS

Make & Model	Price inc VAT	Screen size (in inches)	Signal				Band width (in MHz)	Anti-glare filter	Dot resolution	Dimensions (cms)	Weight (kilos)	Distributor	
			Modulated PAL	Unmodulated PAL	TTL RGB	75 Ohm linear							
Luxor Digital	£574	14						●	25	800	N/A	15.7	P1
Luxor Linear II	£643	14		●				●	25	800	N/A	15.7	P1
Microtech 14	£402	14		●	●	●		●	18	585	33.7×40.8	12.6	M6
TM 22	£329	6			●			●	5.5	N/A	22×34.5	4.1	J3
VM 14 PSN	£378	14			●			●	5.5	300	47×40	13.6	J3
Wolf Cub 1435-TTL	£358	14			●	●			7	653	65×57.5	11.5	S6
Wolf Cub 1456	£454	14						●	10	653	65×57.5	11.5	S6

Make & Model	Price inc VAT	Screen size	Composite video	Audio channel	Mono tint	Anti-glare filter	Band width (MHz)	Dot resolution	Dimensions (cms)	Weight (kilos)	Distributor
AVT DM 210G	£138	12	●		Green	●	12	750	30.8×29.6	9.5	L1
EG 100	£77	12	●		Green		8	700	37.5×29	8	L1
EG 101	£91	12	●		Green		12	700	37.5×29	8	L1
LEDM 091D	£99	9	●		B&W	●	12	750	22×24	5.4	L1
LEDM 0910	£121	9	●		Green	●	12	750	22×24	5.4	L1
Luxor 10	£212	10	●		Orange	●	22	625	N/A	8	P1
M9	£131	9	●		Green		15-22	650	22.4×25.7	5.7	P1
M12	£144	12	●		Green		15-22	800	29.3×30	9.3	P1
Novex	£114	12	●		Green		12	750	N/A	N/A	P1
N12 1003	£112	12	●		Green		24	800	23×26.5	7	P1
Prince	£126	12	●		Green		24	800	33×50	7	C4
PM 102	£126	9	●		Green	●	24	800	22×28	7	C4
Zenith ZVM121	£99	12	●	●	Green		15	N/A	29×29	6.5	P2
U300	£149	12	●		Green	●	18	N/A	34.8×36.8×29.2	7.7	R4

MONOCHROME MONITORS

Make and Model	Price inc VAT	Capacity	No. of disks	Tracks	Sectoring	Sides and density	Connects to								Distributor	
							IEEE	RS232	BBC	Apple II	St. Shugart	Nimbus	Gemini	zima		Others
8" DISK DRIVES																
F 320	£2,300	2.4Mb	2	76	Soft	DS,DD									●	B5
M 2894	£499	1.6Mb	1	77	Soft	DS,DD										A3
M 2896	£493	1.6Mb	1	77	Soft	DS,DD										A3
Megastor 11 DD	£1,133	2Mb	2	77	Soft	DS,DD										V1
Megastor 11SD	£1,018	1Mb	2	77	Soft	DS,SD										V1
Megastor 111	£1,121	2Mb	2	77	Soft	DS,DD										V1
R.M. FDS-2	£3,789	1Mb	2	77	Soft	DS,SD										R3
Tandy Model 11	£999	486K	1	77	Soft	DS,SD										T1
Tandy Model 16	£949	1.2Mb	1	77	Soft	DS,DD										T1
Tandy Model 16	£1,549	2.5Mb	2	77	Soft	DS,DD										T1

MODEMS

A modem interfaces a computer and the telephone system so computers can communicate over long distances. It converts data to electrical pulses or sounds that can be sent down the line. A modem can be connected to the line directly or acoustically. A **D** in the **connection** column represents direct link, while **A** indicates acoustic. The acoustic coupler is like a female telephone handset with a speaker in the coupler opposing the phone's mouthpiece and a microphone opposing the earpiece. A **B** in this column indicates that both methods of attachment are available. **Baud** rate shows the speed with which the data is transmitted.

The modem must be connected to the computer through an interface. The **interface** column lists the main interfaces featured on each modem. **Asynchronous** means that data may be transferred at intervals as available or as needed. **Synchronous** data is transmitted at regular intervals. **Simplex** transfers data in one direction, while **Half duplex** can transmit/receive in either direction, but not simultaneously. **Full duplex** transmits and receives information in both directions at once. Some modems can **originate** a call or start a two-way conversation. **Answer** means they can respond to a call from another computer.

Make and Model	Price inc. VAT	Connection	Data Rates (baud)	Interface	Capabilities						Distributor		
					Others	Asynchronous	Synchronous	Simplex	Half Duplex	Full Duplex		Originate	Answer
AD 1223	£287.50	D	1200	RS232		●							A6
AJ 311	£320	B	300	RS232		●							A5
AJ 1234	£684	A	1200	RS232		●							A5
AM 211	£387	B	300	RS232		●							A5
Bermac 1200/1 Model A	£414	D	1800	RS232		●							B3
Bermac 1200/1 Model B	£460	D	1800	RS232		●							B3
Commodore 64 Modem	£99.95	D	1200	C-64 cartridge port		●							C2

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E1 Epson (UK), 01-900 0466 **E2** Elecomatic, 041-881 5825 **E3** Eicon, Barhill 81825 **E4** Environmental Equipments Northern Ltd, Nantwich 625115
F1 Fastcol, Reading 791557
G1 Geveke Electronics, Woking 26331 **G2** Gemini Micros, Amersham 28321
H1 HAL Computers Ltd, Farnborough 517175 **H2** Hayward Electronic Assoc. Ltd 01-428 0111
I1 Informex Ltd, 01-318 4213 **I2** Intac Data Systems, Rotherham 547170 **I3** ITT Business Systems, Brighton 507111 **I4** ITT Consumer Products, Basildon 3040 **I5** Intelligent Interfaces, Stratford-upon-Avon 296879

CCITT CAT	£228	A	300	RS232/V24													D8
CDSV22	£719	D	1200	RS232/V24		●											D8
DSL2123	£329	D	300/1200	RS232/V24													D8
Prism VTX 5000	£99.95	D	1200	Sinclair Spectrum													P3
Prism 1000	£69.95	D	1200	RS232													P3
Prism 2000	£84.94	D	1200	RS232													P3
Sendata 700 Series A	£253	A	300	RS232, 20ma	1												B4
Sendata 700 Series B	£224	A	300	RS232, 20ma	1												B4
Sendata 700 Series C	£309	A	600-1200	RS232, 20ma	1												B4
Sendata 700 Series E	£149	A	300-1200	RS232, 20ma	1												B4
Racal 126 LS1	£782	D	2400	V24													R2
Racal MPS 3021	£295	D	300	V24													R2
Racal MPS 1222	£678	D	1200	V24													R2

PLOTTERS

Plotters use a pen to put graphics or characters on paper under the command of a computer. They are usually one of two types — flatbed or drum. A **flatbed** holds the paper flat while the pen draws on it in two dimensions. A **drum** plotter turns the paper vertically on a cylinder while the pen moves horizontally. Most plotters can change pens during operation so a variety of colours and line thicknesses are available. **Max pens** indicates the number of pens in operation or on standby. Dimensions of the paper to be used are listed under **paper size**. **Maximum plotting speed** measures the distance in millimetres per sec covered by the pen. **Interfaces** are included in the basic price or come at extra cost.

Make and Model	Price inc VAT	Type	Max Pens	Paper Size	Maximum Plotting Speed in secs	Interface (+ at extra cost)	Distributor
Calcomp 81	£3,392	Flat	8	A3	30cm	RS232 or IEEE	C3
HP 7470A	£1,317	Drum	2	A4	38.1cm	RS232 (IEEE+)	H2
MT Pixy 3	£688.85	Flat	3	A4	200mm	Parallel (RS232+)	M3
PD4	£585	Flat	1	A4	700mm	(IEEE+)	J2
RY-21	£747.50	Flat	1	A4	200mm	Centronics, (RS232+)	R5
RY-10MZ	£1,865	Flat	8	A3	400mm	Centronics, (RS232, IEEE+)	R5
Strobe 100	£662	Drum	1	A4	7.6cm	(RS232, Parallel+)	D6
TRS-80 Pen Plotter	£1,399	Flat	6	A4	6.8cm	RS232	T1
Watanabe WX 4635	£2,301	Flat	1	A3	250mm	(Centronics, RS232, IEEE+)	E4
Watanabe 4637	£2,862	Flat	2	A3	400mm	(Centronics, RS232, IEEE+)	E4
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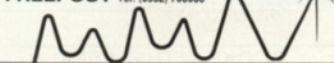
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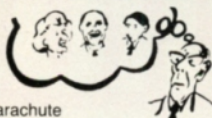
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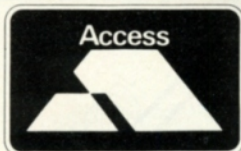
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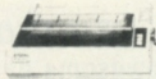


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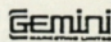
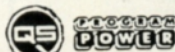
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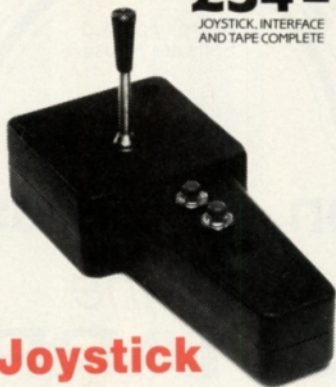
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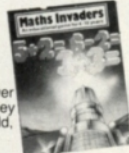
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MONEY

(Spectrum 48K)
— an introduction to coins and notes and their use in shopping. Many detailed sections with excellent graphics and sound. 4-10 years old.



MATHS INVADERS

(Spectrum 16/48K, BBC B/Electron)
Load your gun with the right answer and shoot the questions before they land on you. Makes learning to add, subtract, multiply and divide, great fun. 4-12 years old.

Also, look out for: Identikit (48K Spectrum), Time (48K Spectrum), Missing Words (48K Spectrum), Railroader (BBC B/Electron), Micros for Children — 1 (16/48K Spectrum). Spectrum programs only £6.95 BBC £7.95.

All programs are attractively packaged in red boxes, with colourful pictures of each game.

Most titles will be available from larger branches of Boots, John Menzies, W. H. Smiths, and good computer shops. Stell Software, 36 Limefield Ave, Whalley, Lancs BB6 9RJ.

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Word games

Quantum Leap may sound like a name fit for a machine that takes huge technological strides . . . but Sir Clive has been a little less obvious. Taken from the Latin *quantus*, meaning how much, one way of defining quantum is: the least possible amount that can suffice.

Just say small is beautiful. Meanwhile names are playing different games at Oric. Atmos is

Greek for vapour. With your new-look Oric you get an invitation to join the Oric Owners Users Group which, apparently, boasts 'an advanced research and development section . . . which aims to bring you up-to-date hardware add-on's (sic) at favourable members' discounted prices. We have already achieved this for other micros . . .'

They have? You mean this group had the modems and disk drives all the time? Sure makes you think . . .

School daze

Tom Shipman (Supplies) Limited seems to have had a nasty attack of the Lolita complex in packaging its latest educational software. If only to protect headmasters from themselves we urge Tom Shipman to place a clearly visible '16 and under' warning on the tapes and send them out in plain brown cassette wrapping.



Model pigs

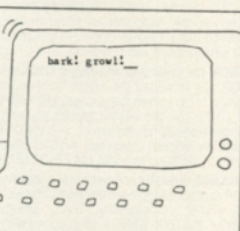
Hey, pig spender—have we got a program for you. Computer simulation has taken another giant leap forward with the development of the Micro-model Pig, which simulates the

life-cycle of the humble trough quaffer.

So if you're a pig farmer and feel you could make a lot more money by turning up the heat in the pig unit this is the program. It is being sold, for £550, by HM Boot, Bleak House Farm, Nantwich, Cheshire.

PAL-2000
by Mollusc

SPACE
P.O.G.
PROGRAM



Aylesbury, hitherto famous for ducks, must now become known as the town of two computer clubs. There is the Computer Club, Aylesbury, featured in issue 46, and the Aylesbury Computer Club, not so far featured in PCN but named by mistake in issue 46. Our apologies to both clubs for the confusion which they will surely agree is wholly understandable.

NEXT WEEK

Stardust — Does the stylish new Oric flatter to deceive?
Atmos — Find out in our exclusive Pro-Test.

Catch 64 — Jazz up your games programming with a sprite generator for the Commodore 64.

Wider Spectrum — A machine code routine for a 42-column display.

Atari extra — Our pull-out Micro-paedia puts up six 600XLs in a competition.

Dragon designs — A new text designer should give your Dragon a facelift.

PCN DATELINES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in

PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
The Apricot & Sirius Show	February 7-9	Kensington & Chelsea Town Hall	Dennis Jarrett, 241 2448
LET '84	February 13-15	Heathrow Penta Hotel	Anthony Farrar, 0923 774262
Information Technology & Office Automation Exhibition and Conference	February 21-24	Barbican Centre, London EC1	B.E.D. Exhibitions Ltd., 01-647 1001
Educational Software Fair	March 2-3	Dauntsey's School, West Lavington, Devizes, Wilts	P. Harris, Lavington 2446
OEM Only Conference	March 7	Hilton Hotel, London W1	Tom Lewis, 01-994 6477
Computer Trade Show	March 13-15	Wembley Conference Centre	Reed Exhibitions, 01-643 8040
Scottish Computer Conference	March 13-15	Holiday Inn, Glasgow	Quadrilect, 01-242 8697
Essex Apple Village	March 25-28	Festival Hall, Basildon, Essex	Database Publications, 061-456 8383
Computer Aided Design	April 3-5	Met. Exhibition Hall	Reed Exhibitions, 01-643 8040
Sir Frederick Osborn School Computer Fair	April 8	Sir Frederick Osborn School, Welwyn Garden City	Alan Henderson, Welwyn Garden 23367/8
COMPEC WALES	April 10-12	Cardiff University	Reed Exhibitions, 01-643 8040

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
Personal Business Computer Show	February 29-March 3	Hong Kong	Overseas Exhibition Services Ltd., 01-486 1951
Personal Computer Show	March 14-17	Sydney, Australia	ECL Ltd, 01-486 1951
International Business Equipment & Computer Show	March 13-17	Singapore	International Business Centre Co. Ltd., 8F Hosoi Building, 15-7, 5-chome Honmachi, Higashi-ku, Osaka, Japan

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SLANTAX ERRORS

fantasy

SOFTWARE

DOOMSDAY CASTLE

is an arcade style game
with the feel
of a real adventure

Doomsday Castle consists of a labyrinth of 76 complexly inter-connected Halls and Passages where you will meet a whole host of adversaries serving the infinitely evil Scarthax, the Garthros, the Orphacs, the phenomenally nasty Googly Bird and the Urks which manifest themselves in over fifty unbelievably weird and wonderful guises.

Scarthax has scoured the Universe to bring together the six ancient stones of life force. United in Doomsday Castle they are being used to wield an irresistible power over the cosmos, emanating waves of corruption through every galaxy.

To save the Universe, you must battle your way through the Castle to find and collect the six stones and use their force against Scarthax to destroy Doomsday Castle, hopefully escaping yourself before the final cataclysmic explosion.

The task is not easy (saving the Universe never is!) and it will take you many games to unfold the structure of Doomsday Castle and discover the locations of the ancient stones. The addictive arcade style action will keep you coming back to play but the overall challenge should still keep you occupied for months.



You take on the role of our super hero ZIGGY shown here above in his exploratory capsule in combat with an Urk disguised as a pangalactic gargleblaster (!!) This is a true representation of the on-screen graphics.

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COMPUTERS FOR ALL** and all other
good software retailers.

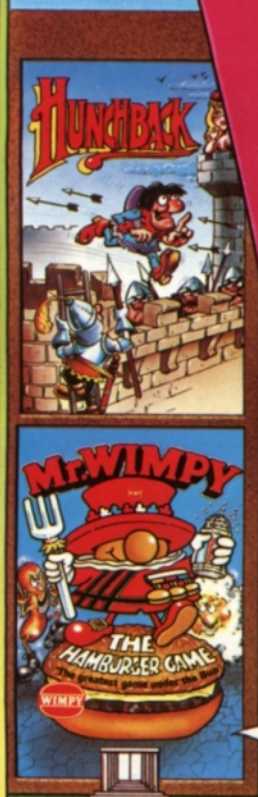
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Ocean Software,
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Telephone: 061 832 9143.

Ocean Software is available from selected branches of: **WOOLWORTH**, **W H SMITH**, **John Menzies**, **LASKYS**, **Rumbelows**, **Spectrum Shops** and all good software dealers. Trade enquiries phone: 061 832 7049.